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UNIVERSITY OF ALBERTA

AN INVESTIGATION OF MODULAR INSTRUCTION IN THE TANZANIAN PRIMARY SCHOOL SYSTEM

by

SATOKI T. MAHENGE ©

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF
DOCTOR OF PHILOSOPHY

DEPARTMENT OF SECONDARY EDUCATION

EDMONTON, ALBERTA

SPRING, 1991

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THE UNDERSIGNED CERTIFY THEY HAVE READ, AND RECOMMEND TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH FOR ACCEPTANCE, A THESIS ENTITLED An Investigation of Modular Instruction in Tanzanian Primary School System SUBMITTED BY Satoki Taratibu Mahenge IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATIONAL TECHNOLOGY AND INSTRUCTIONAL MEDIA

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DEDICATION

I respectfully dedicate this dissertation to my wife Gloria A. Mahenge; my daughters Anesi S. Mahenge, Nesia S. Mahenge; and my son Baraka S. Mahenge; for their patience and perseverance in staying in Tanzania without me for the five consecutive years of my Masters and Doctoral study period in Canada. I missed them. They missed me too. Such a long period without family togetherness is a terrible experience for human life that deserves due respect. In gratitude I dedicate this dissertation.

ABSTRACT

The purpose of the study was to observe, describe and analyze potential factors that would need to be considered in introducing modular designs for learning in Tanzanian primary schools.

In order to collect data, the researcher conducted a study in four primary schools with 140 pupils, 4 teachers and 4 observers in Tanzania.

The study examined whether rural and urban environments would exert significant influences on learning modular programs, and whether modular programs would necessarily require teachers' instructional assistance. A qualitative approach was also used to describe factors which unfolded during the study.

Further, the study explored whether the combination of environment and instruction would indicate an interaction effect on pupils' test results. The study also investigated whether pupils' attitudes toward the program would be related to the environment of the school and type of instruction.

The findings revealed that, although the modules were effective in teaching Geography topics to both rural and urban pupils, the urban pupils benefited considerably more than those in rural schools. The results also reflected a slight difference in that pupils who were studying the modules under teachers' individualized instruction scored higher in the test than those who studied it independently. However, the difference was not significant between the two groups.

The combination of environment and instruction indicated no interaction effect on the test results of the program. The findings also revealed no significant attitudinal relationship in the measurement results on the basis of environment and instruction variables.

Teachers' attitudes and acceptance of a new program were observed to depend on pupils' achievement in the program and administrative convenience of the new program in relationship to teachers work load. More extensive research studies in various subjects and grade levels are suggested by the present study. Team work in such studies is strongly recommended.

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CHAPTER 1

INTRODUCTION

Statement of the Problem

Problems facing the existing primary education system in Tanzania today are multiple. The problems relate to a great extent to the poor quality of instruction and lack of learning facilities which create barriers for most pupils to effectively comprehend classroom lessons.

The problems in understanding their lessons manifest themselves in the numbers who have low achievement. In addition there is a loud public outcry about the high numbers of pupils completing their primary education with a low attainment of knowledge and skills.

Some problems have in fact become so deep seated that it has become increasingly difficult to solve them. The underlying major cause of the problems is the low economic capacity to support education. In essence, the inadequacy of the economy has resulted with a shortage of everything except pupils.

The inadequate economy has caused many other problems. There is a shortage of teaching facilities, ranging from instructional media, both hardware and software, to lack of school libraries. Overpopulated classrooms, an inadequate number of teachers, poorly qualified teachers, and mass methods of teaching create a lack of individual attention (Omari, Mbise, Mahenge, Malekela, and Besha 1983; Omari and Mosha, 1987).

The principal teaching method used in primary education in Tanzania is basically the "chalk-and-talk" method used with large groups of pupils congested in classrooms. The number of pupils per classroom varies from 30 to 100 (Wizara ya Elimu, 1986). In addition to the chalk-and-talk method, sometimes questioning pupils and giving assignments is also done. The number of pupils per class forces teachers to attend to the whole class in general, with very little attention to individual learning problems.

The predominant and very simple materials used in teaching include chalk, chalkboard, pencils/pens, exercise books and textbooks of which there are not enough. For example, 13 pupils share one textbook, a ratio of 1:13, instead of the recommended ratio of 1:1 (Wizara ya Elimu, 1986).

Some of the typical problems in the Tanzanian primary education classroom are similar to other developing and developed countries. They are summarized as follows:

1. There is a wide range in the quality of instruction resulting from differences in the academic and professional background of teachers.

2. Large group instruction predominates, and it lacks the mechanism for immediate and effective correction of errors for individual learners. Othman and Loganathan (1981) contend that large group instruction usually produces errors in learning at every stage of study. Thus, there is a tendency for neglecting pupils' individual differences. Students are passive not active learners.

3. There is also a continued over-emphasis on the part of the teachers in completing the official syllabus material for examinations rather than teaching pupils to master skills, concepts, and values.

4. Due to very poor conditions of learning in primary schools, as described above, pupils have difficulty in comprehending instruction in various subjects. This was an issue of concern which the present study aimed to explore by determining an approach that would be complimentary to the existing chalk and talk teaching methods.

Parents and the public in general have a low trust in primary education being able to prepare their children for a future productive life. Poorly performing pupils in academic school work tend to be passive and sometimes withdrawn from school life as it fails to provide motivation and a promise for better life after they have completed primary education.

About 80% of the entire primary school population in the country is in rural areas. Rural pupils do not have access to external educational support systems which facilitate learning compared to their counterparts in urban schools. For example, in urban schools pupils have access to public libraries, book-stores, stationery stores, a literate community, part-time tutorials from teachers, and parents (Omari and Mosha, 1987).

Response to the Problem

There have been persistent discussions in parliament and in various other forums on falling standards of primary education in

Tanzania. At different stages of time, the government has urged the Ministry of Education to commission a formal nation-wide study on the allegations. The Ministry of Education assigned the Institute of Curriculum Development to carry out such a study. In addition, the Ministry of Education itself launched a sector review of primary education to check the quality of education, and the flow and utilization of resources.

At a later stage, the government set a Presidential Commission to review the educational system in the country and to make recommendations leading to higher standards for the entire education system (Omari et. al., 1983).

The current central concern of the government is to improve the quality of education at all levels. Thus, the quality of universal primary education is at the center of the government's attention, as it is considered to be both terminal and a prerequisite for higher education. Among the first priorities is to improve the quality of teaching through in-service teacher training programs.

Cummings (1986) points out that improving the quality of education at reasonable cost is possibly the most challenging problem faced by leaders of developing countries. Cummings contends that, during recent years in several developing countries, the cost of education has increased while average school performance has often declined. Rural areas lack educational materials and facilities compared to some urban schools. However, Cummings is optimistic that modular interactive instruction can deliver quality education at reasonable cost if properly designed.

Tanzania is among the developing countries which have committed themselves to education as being one of the basic priorities for the development of the nation. Ironically, the budget for education has never been able to meet the demand of ever growing educational expansion in the country, due to economic instability. It thus becomes realistic to think of learning resources which are easily available and accessible to primary schools for solving classroom learning problems.

Whereas very rich countries can afford highly sophisticated technological facilities such as computers, television, videos and other related multimedia instruction in primary education classrooms, countries with a less-strong economy may think along similar lines of technology, but use affordable delivery systems such as printed modular materials.

Considering the many and sometimes novel problems that developing countries face, it makes sense for research institutions and scholars to direct their efforts more toward development research than purely academic research alone. To this end Kuhanga (1983) makes a point that

> Research is always considered to be a priority in universities, although the emphasis and the type of research carried out varies from one university to another. Some universities lean heavily on the side of fundamental or pure research while others, and especially those in developing countries, place greater emphasis on applied research (1983 p. 30).

Thus a major reason for studying materials adaptable to the Tanzanian primary school curriculum was to identify which factors would require the most attention when introducing them in schools.

Along with this supposition, Hawe's (1979) views are essentially important to note:

> However efficiently we can select materials, their effectiveness will still be in strict proportion to their relevance to the educational context in which they are being used (1979, p. 1).

The present study is timely when one examines the current pressures in the country which are manifest in three ways. First, the government is attempting to improve the quality of education in the country, including primary education. This pressure suggests explorations of various instructional alternatives: for example, modular interactive instructional designs.

The second pressure emanates from the 1987/88 and 1988/89 Budget Speeches made by the Minister of Education (Wizara ya Elimu, 1987, 1988) in parliament in Tanzania. He proposed a plan directed at stimulating textbook writing for schools in Tanzania. This plan provides an opportunity to respond to the call in considering the need for some textbooks and supplementary readers to be written in a modular interactive instruction format.

To determine whether such an innovation would be effective in improving learning in Tanzania, the policy makers, curriculum developers and classroom teachers would require evidence. Hence, evaluative studies on instructionally designed modular materials, in various subjects and for various levels of education, would be useful for making decisions.

A third pressure exists, although it is not officially recognized. It is nevertheless very strong and exists mainly in urban areas. Due to inadequate classroom teaching, parents are becoming more responsible for arranging private tutoring in homes for their children, to supplement school classroom teaching.

The private tutoring is an agreement between teachers and parents who have sufficient financial resources. Teachers spend time beyond the school hours to teach the children either in school premises or in their homes. Private tutoring is becoming a lucrative business that benefits the teachers financially and the pupils educationally.

Teachers can sometimes obtain more money from private tuition than from their teaching salaries. The "big money" they get from private tutoring motivates them to work extremely hard to be sure that the students pass exams for entry into secondary education. Therefore, they create confidence among the parents and the pupils.

On the basis of each teacher's reputation and familiarity, they make contracts with many pupils every term. Only about 10 percent of the country's total population live in towns where some parents have paid jobs or private business and can afford to pay the private tutoring fees for their children.

On the other hand, 90 percent of the country's entire population live in rural areas with a peasant economy. Tanzanian rural life and its population distribution makes it very difficult to engage pupils in private tutoring. Thus pupils depend on the regular classroom instruction which appears to be lacking. In light of the third pressure, there is a need for instructionally designed materials to supplement classroom instruction with a much lesser cost than paying private tutoring on an hourly basis.

The Purpose of the Study

In order for pupils to benefit from academic schoolwork, there is a need to seek various alternatives which can enhance pupils' learning. Individualized and self-paced learning may help in improving learning for most pupils.

The purpose of the present study was to observe, describe, and analyze some of the factors that may be important when considering the introduction of instructionally designed materials for learning subjects in Tanzanian primary education.

The study examined the following key factors: environment of the schools, especially rural environment compared with urban environment; and type of instruction, specifically teacher assisted instruction compared with pupils' independent study. The study also examined teachers', and pupils' attitudes toward the program and attempted to identify specific strengths and problems in starting such a program. The following research questions serve to further clarify the purpose of the study:

1. Is the environment of the school a determining factor in the successful implementation and use of modular materials in effective learning?

2. Do primary school pupils in Tanzania who study instructionally designed modules with teachers direct individual instructional assistance differ in achievement

when compared to those who only receive administrative assistance?

3. Does the combination of environment of the school and the type of instruction used in studying modular programs, have a unique effect on achievement results?

4. Will the environment of the school and the type of instruction have any significant bearing on pupils' attitudes about the study of modular programs?

5. What are some of the factors that should be considered in introducing instructionally designed learning programs, for the primary school system in Tanzania?

Developing the Null Hypotheses

Although there is evidence of the effectiveness of modular interactive instruction in countries where it has been tested (IDRC, 1981; Grayson, 1982;) one needs to provide conclusive evidence that appropriately designed materials adapted to the setting should also be successful in Tanzanian primary education. The key is adapting the design to the people and setting.

The first research question is based on earlier evidence from research (Kulik,1968; Porreca, 1974; Merrill, 1984,) that modular interactive instruction is effective and self-sufficient in guiding pupils to learn a subject. Therefore, one would expect that factors such as rural and urban environment would not result in a significant difference in academic achievement through a modular approach. On the basis of this assumption the researcher developed the following null hypothesis:

Null Hypothesis 1.

> There will be no significant difference in achievement on the test between rural and urban primary school pupils.

The second research question intended to find out whether the results would lead to similar conclusions in primary education in Tanzania. Based on theoretical postulations and research evidence focusing on the use of instructional technology in learning (Hartley, 1978; Grayson, 1982; Archer and Woodlen, 1968), use of interactive instructional modules appears to be a self sufficient approach that it is capable of guiding pupils' learning. Thus, the use of modular instruction would not necessarily require the teacher's direct instructional assistance to individual pupils. With this background the researcher developed the following null hypothesis:

Null Hypothesis 2.

> There will be no significant difference in achievement results between groups of pupils using the program with teacher's individualized instructional assistance and those who study the same program independently.

The third question considered whether there would be any interaction effects on measurement results between environment of the school and the type of instruction given to the pupils in studying subjects through the modular approach. The researcher developed the following null hypothesis:

Null Hypothesis 3.

> There will be no interaction effect on measurement results between the environment of the school and the method of instruction used in studying the program.

The fourth research question arose from some studies and reviews (Begin, 1981; Flores,1981) which reported controversial conclusions relative to teachers' and pupils' attitudes. Some studies (e.g. Blake and McPherson, 1973) reported a positive attitude among pupils and teachers after using the modules. On the other hand, some research reviews (e.g. McKinley,1981; Cummings, 1986) reported negative attitudes among teachers and pupils after using the modules.

Chapter 2 reviews results from some countries which have adapted the innovation in different settings, resulting in multiple advantages which override disadvantages (IDRC, 1981; Cummings, 1986). The literature review suggested to the researcher that pupils and teachers in Tanzanian primary education who experience the approach would realize its importance in learning efficiency.

Much of the acceptance of modular interactive instruction depends on the management system in place, including the new role of the teacher as an administrator of the program. If materials are available, pleasant to work with, and perceived by learners to be helpful, learners will have a positive attitude regardless of the presence of teachers' instructional intervention and the environment of the school. The goal of the design and development is to create the above conditions. The above background directed the researcher to the following null hypothesis:

Null Hypothesis 4.

There will be no significant difference in pupils' attitudes toward the program on the basis of environment or instructional management.

Collection of Qualitative Data

In addition to the above questions, which essentially directed the quantitative data collection a qualitative approach of the study was built in to identify specific strengths and problems related to introducing the program. Since the researcher did not know the strengths and problems he would encounter during research in the field, he wanted to be open to any useful data that would unfold in the process of introducing the modules in primary schools.

Consistent with the qualitative approach, no additional null hypothesis or variables were identified for investigation before going to the field. However, the researcher set up a management scheme to observe and collect qualitative data in order to answer the fifth research question: "What are some of the factors that should be considered in introducing instructionally designed learning programs, for the primary school system in Tanzania?"

The fifth research question stems from the assumption that since some previous research studies (Porreca, 1974; Singer, 1974; Grayson, 1982; Merrill, 1984;) have shown that instructional modules are effective for learning, they would also be effective in the Tanzanian primary school system. However, their success would more likely depend very much on the local conditions and behaviors of the users.

Definition of Terms

This section defines specific terms and expressions which have been used within this dissertation. Certain terms and titles have been used interchangeably and carry the same meaning within this dissertation:

Modular interactive instruction:

"Modular interactive instruction" refers to printed materials where the subject matter has been presented in open-ended segments designed to guide a learner step by step individually. Specifically a module is a self contained, independent package with a planned series of learning activities. The purpose is to help learners to accomplish specified objectives.

In order to avoid monotony, the term is used interchangeably with other terms which carry the same general meaning. Other terms include: "instructionally designed materials", "instructionally designed work books", "instructionally designed learning program", "instructional modules", "modular instruction", and "instructionally designed modules".

Instructionally designed modules:

These are modules which were designed by following a systematic process in order to create efficient and effective instruction. They are usually designed for independent study situations where the design is guided by an analysis of learners, content, and the learning environment. The basic elements include: rationale, objective, pretest, learning activities, self-testing, and post-test.

Interaction:

When the term "interaction" is used along with "interactive lessons" it carries the meaning of an atmosphere and process for learning. The term and the expression work together to enhance learning.

Since both the term and the expression play a key role in the learning process they have been defined fully in Chapter 2 under the section of theoretical considerations on modular instruction. Specifically the term "interaction" is used in this dissertation to indicate a condition and process in which each individual learner responds and reacts to each step by reading each segment of the subject presentation, then answering questions related to the segment read. The learner is provided with immediate feedback on his/her performance.

Interaction effects:

When the expression "interaction effects" appears along with a research question, hypothesis, or the related discussion in this dissertation it refers to the statistical meaning related to whether the combination of the environment of the school and the type of instruction used in studying the program would have a significant effect on achievement results.

Environment of the school:

The expressions "environment of the school" and "environmental setting" are used synonymously in this dissertation to indicate location of the school and the surrounding educationally related facilities for learning in general.

The general facilities include both human and non-human resources. For example, school and public libraries, classroom software and hardware for learning, medical facilities, commercial facilities, recreational facilities, institutions of higher learning, employment opportunities, schooled communities and parents and neighbors.

Primary schools:

In the Tanzanian context, where the study was conducted, primary schools include grades one through seven. "Primary schools" has been used synonymously with "primary education", "elementary schools," and "elementary education" throughout the dissertation.

Rural

In the Tanzanian context the term "rural" refers to geographical areas where the people live in small villages and their main occupations are farming and raising various animals for food.

Urban

"Urban" is a term used in this dissertation to refer to a cosmopolitan city. In this context the major port of Dar-es-Salaam is the most cosmopolitan city in Tanzania.

Significance of the Study

This study has significance for educational practice in that it provides some insights into crucial factors for consideration when introducing modular programs in Tanzanian primary education. The quantitative and qualitative methods of inquiry used in collecting data were intended to provide an understanding of factors and problems in starting modular instruction in Tanzanian primary education. As such, the study has significance for research in that it compliments the findings of other studies in the literature related to the application of instructionally designed modules.

Since there is a distinct difference between rural and urban environments in Tanzania, the researcher investigated whether environment, as an independent variable, would have any bearing on learning curricular subjects through the modular approach. An investigation like this one, based on the location and environment of the school supplements the body of evidence relating to the use of the modular approach in different settings.

The description of planning, designing, and developing instructional modules based on a local Tanzanian curriculum guide could provide a useful framework for the concerned educational planners and implementors of Tanzanian primary education. Although the study is of limited scope the researcher anticipates that it could entice curious educators in Tanzania and thus generate further in-depth and extensive studies in various disciplines at various grade levels.

The modular approach is a new instructional approach in Tanzanian primary education. Hence the knowledge that the approach is effective for learning in Tanzanian primary education could inspire curiosity among curriculum developers, school inspectors, teachers and pupils. In that way, the approach could add to the warehouse of various learning models in the country. The findings of this preliminary study should also provide a base for proposing that the Ministry of Education conduct more in-depth studies in various disciplines and grade levels. With larger scale and more in-depth studies, the Ministry would determine whether to promote the approach in primary school education.

Delimitations of the Study

1. This study focused on the use of the interactive instructional modular approach, using Geography for grade five pupils. It makes no attempt to analyze other disciplines or other grade levels. For that reason, the findings and conclusions are delimited to one discipline at one grade level only.

2. The investigation involved one political and ecological region out of 21 regions (provinces). Due to the ecological diversity of the regions, the same study could provide different results in different regions.

3. Due to the intactness of the school timetable and the duration of the study in the schools, it was necessary to have certain blocks of periods where it would be possible to have all the pupils together in each school. It was not possible to get a random sampling of the subjects for all the four months of the study. In the light of this constraint, it was necessary to use an intact class of 35 pupils in each school. However 35 pupils were not in attendance in each school for each session. The pupil's irregularity in attending the sessions caused difficulty in completing the modules according to the time schedule.

4. Because of the time consuming nature of the frequent observation techniques and administrative activities for material distribution and record keeping, and the restricted resources of the researcher, the researcher limited the sample size to 140 pupils and 4 teachers in four schools.

Limitations of the Study

1. Instructionally designed learning programs as an approach to learning various subjects may use different delivery systems such as computers, video systems, interfaced multimedia systems, printed modules (workbooks) etc. Because of the factors surrounding the context and site of the study, the researcher was limited to using printed modules as a delivery system. The results of the study may have been different if other delivery systems had been used.

2. The use of instructionally designed modules was a new approach to the schools where the study was carried out. It could be possible that such newness would lead to novelty effect to some

pupils and teachers. Such factors might have lead to responding positively to any enquiry on the study.

3. Generalizability of the findings limits to a small sample size, use of one curricular discipline, and lack of randomization. The comprehensiveness of data generated through both quantitative and qualitative research techniques should suggest the development of insights for further studies on the use of the modular approach in Tanzanian primary education.

Ethical Considerations

Any research directed toward getting information about human activities and behavior has some implications which, if not considered, may make the research difficult or may even create other unknown problems. In light of this precaution, and the nature of the study, the researcher requested official permission at different administrative levels (Appendix A).

First, the researcher secured a letter from the Department of Secondary Education at the University of Alberta that was addressed to the University of Dar-es-Salaam in Tanzania which asked for research clearance from the University of Dar-es-Salaam for conducting the study in Dar-es-Salaam region. The research clearance allowed the researcher to obtain a letter from the Regional Education Office requesting the District Education Officers (D.E.O.) of two districts to select schools for the study.

The D.E.O. informed the heads of the schools selected for the study and requested them to assist in carrying out the study. The Heads of the schools requested pupils and class teachers for their cooperation in the study.

The researcher together with teachers in the study treated pupils' records, such as test results, confidentially. Hence, pupils' names were listed by numbers so that anonymity and confidentiality might be maintained. The numbers were used in writing tests as well as in reporting test results. A confidential file was kept with pupils' proper names and their corresponding numbers, by the teacher in-charge of the class, in case pupils forgot their numbers or if anything concerning proper names was needed.

Structure of the Dissertation

This dissertation has seven chapters. Chapter One highlighted the problem of the study, the purpose of the study and rationale for the study in Tanzanian primary education. Based on the nature and site of the study, the chapter highlights briefly the necessary ethical considerations the researcher considered to be important in carrying out the study. The chapter ends with a summary of the structure of the dissertation.

Chapter Two reviews the literature on theories and studies regarding the use of instructionally designed learning programs in schools. The chapter points out that such studies are context bound. The researcher points out that earlier studies have reported inconclusive findings and conclusions. Hence, it was important to explore further the use of the approach in Tanzania where there have been no such studies before.

Chapter Three focuses on the design and procedure used in preparing the modules. The chapter reviews some theories on developing modules from currently respected instructional technologists such as Dick and Carey (1985) and Gagne, Briggs, and Wager, (1988).

Chapter Four provides a working theoretical framework which was used as a guide in focusing procedures for the present study and the research methodology used in collecting data. The chapter is divided into: a working theoretical framework, methods of introducing modules, the organization of the study, selection and description of the schools for the study, stimulus materials and types of research instruments used in collecting data, selection of the sample, procedures used in collecting data and how the data was processed and analyzed.

Chapter Five includes an analysis and discussion of the findings of quantitative data.

Chapter Six analyses and discusses the qualitative data collected from the field. The researcher used participatory observation and subjective descriptions from teachers and observers in attempting to derive meanings of the research findings in order to answer the fifth research question.

Chapter Seven presents some considerations and suggestions made on the basis of the findings of the study.

CHAPTER 2

LITERATURE REVIEW

Theoretical Considerations

There are many effective models of instruction that can enhance learning and help students in growing as effective learners. Each instructional model has a unique influence on students' abilities to educate themselves as well. However, classroom teachers must have seen there is no single teaching model which claims itself "the most effective model" for all types of learners, in all subjects, and in various contexts.

The researcher decided to use modular interactive instruction for the present study, not because it is outstandingly effective in all walks of professional teaching, but because it interests the present researcher as a classroom teacher. The words modular and interactivity in place of "programmed instruction", caught the researcher's attention for the reason given in the following section.

Historically, scholars have criticized the label "programmed instruction" claiming the label does not reflect the centrality of the learner's active role. They relate programmed instruction with an exclusively designed machine for instructional purposes only (Lysaught and Williams, 1968). From such attacks (and, of course, scholars' orientations and fields in which they work) various labels have evolved. Today many sources of literature have various names. Hence, the label "programmed instruction" is a precursor to the contemporary approach "interactive instructional technology."

Various sources provide different labels, including: programmed instruction or programmed learning (Hartley, 1978; Skinner, 1968; Lysaught and Williams, 1968); individualized instruction or individualized learning (Duane, 1973; Postlethwait, 1978); instructional technology (Baker, 1973; Gagne, and Glaser, 1987); structural communication (Egan, 1976); self-paced instruction (Hernshaw and Roach, 1974; Smith, 1974); systematic instruction (Dick and Carey, 1985); auto-instruction (Lysaught and Williams, 1968) and modular instruction (Russell, 1974; Russell and Johanningsmeier, 1981).

The approach can be designed for various purposes such as: a) being complementary to conventional instruction, b) for enriching some units in the regular curriculum, c) for remedial purposes in areas of difficulty as a result of using conventional instruction, and d) for reviewing instructional materials from regular instruction.

On the other hand, the approach could also be the core instruction for selected goals with the teacher's role being that of an administrator and consultant according to individual needs. Although scholars provide elaborate explanations about what constitutes each of the above constructs, basically the principles behind each construct are not very different. It is notable that in each construct, there is no indication about the delivery systems needed to effect the type of instruction.

The present study conceives the phrase "interactive modular instruction", as a process of arranging subject-matter into an open-ended series of segments designed to guide a learner step by step through self-instruction. The learner responds and reacts to each step by reading each segment of subject presentation, then answers questions related to the segment read. The learner is provided with immediate feedback answers on his/her performance (Gagne, Briggs & Wager, 1988; Dick & Carey, 1985).

On the other hand the present study equates interactivity with a process of active learning. Accordingly, interaction is an internal mental process caused by external conditions (Hannafin, 1985). The heart of this definition is that interaction is what goes on inside the learner as s/he meets certain conditions. This definition shares much with early theories which viewed interaction as the process in which one relates his/her previous learned experiences and knowledge to the present stimuli (Gagne et. al., 1988).

The above definition of the term interaction for individual human learning does not involve the external characteristics of any given learning model itself. Rather it has to do with the processing of knowledge. This being the case, the interactive model of learning in this study is merely an external condition which helps the internal mental process.

Since the present study uses the term interaction as internal subjectivity in processing knowledge, which leads to a goal (learning), there are implications for the process of learning. For example, Clark and Salomon (1986) use research findings in examining interactive learning from the angle of instructional media and learning.

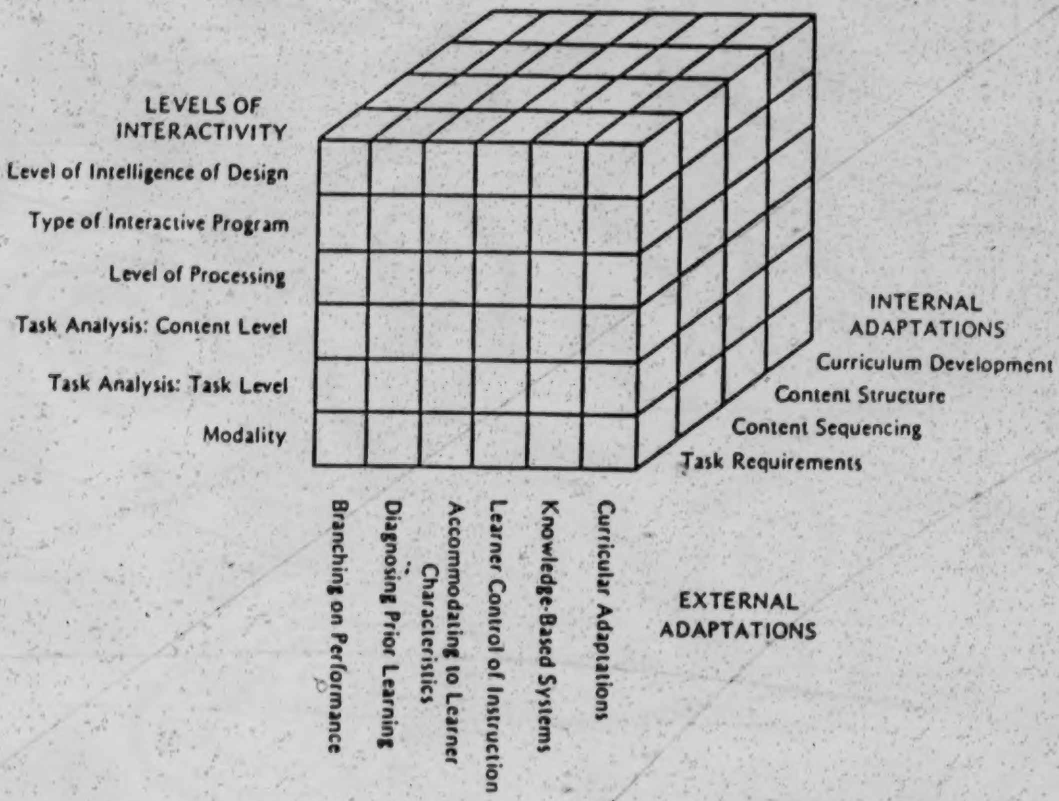
They point out that the decision to use interactive learning models will affect the design and use of learning materials, and educative presentation. The effect applies in all models regardless of whether one uses programmed texts, xeroxed handouts, or interactive computer assisted instruction.

Since interactive learning involves deeper mental processing, the process trains the learner's mind in complex thinking, thus leading them toward experiential educative growth. The interactive model of learning creates a condition for active personal communication which is most effective because it provides personal, active participation and experiences to the learner. Although any instructional model, such as individual tutoring, may be quite interactional for observable communication, learning will not occur unless the learners interact internally and subjectively with the material of instruction.

According to Hannafin (1985) research evidence shows that the more interactive the instruction, the greater the learning. Similarly Jonassen (1985) defines an interactive lesson as one which at least shows the appearance of two-way communication. Jonassen contends that interactive lessons are those in which the learner actively or overtly responds to information presented by the technology. In turn the technology adapts to the learner, a process commonly referred to as feedback.

Jonassen provides an illustrative model (Figure 1) showing a taxonomic view of interactive and adaptive lesson designs.

Figure 1.
Taxonomy of interactive, Adaptive lesson Designs



From:

Interactive lesson designs: A taxonomy. By David H. Jonassen. Educational Technology, 25 (6), 1985.
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The taxonomy stands as a guide to instructional designers in selecting the proper levels of interaction and adaption. The use of Jonassen's model would depend on the nature of the program. For example: drill-and-practice; tutorial; problem solving; simulation; mixed initiative; and so on.

Although Jonassen's model shows a total number of 144 options available to instructional designers, one can select and match the interactive with adaptive options. The options would be practicable according to the delivery system which one will use, the nature of tasks, learners' characteristics, and related learning conditions.

The generic concept "interactive modular instruction" marks a substantive difference from conventional teaching methods in the sense that it is a complete instructional technology. It takes into account all the events which may have a direct effect on the learner. A program designed in accordance with the concept should involve systematic procedures for instructing the learner step-by-step. It should inform the learner of the goals, structure of the material, tasks for learning, and techniques and procedures for studying the program. The program should include a teacher's guide including a statement of the new role that the teacher will play to help students if in need (Gagne & Glaser, 1987; Gagne, et. al., 1988; Egan, 1976; Cronbach & Snow, 1977; Dick & Carey, 1985; Russell, 1974; Russell & Johanningsmeier, 1981).

Depending on the delivery system used and the level of the modular instruction, the paradigms are somewhat flexible to permit some degree of learner control. Essentially, they can adapt to the learners' needs (Merrill, 1984, 1985, 1987; Russell, 1974; Russell & Johanningsmeier, 1981).

Merrill (1985) contends that through the use of workbooks and other materials the learner can manipulate the process of learning. In essence, during self-paced individualized study, the learner can exercise some degree of content control.
Much of the learner's control of instruction depends on self pacing and the opportunity to select a particular segment and sequence with which s/he feels comfortable. Merrill (1985) points out that with a workbook, for example, one can skip a few pages or scan for what is important. Merrill illustrates by associating the workbook delivery system with computer based learning. Thus, for example, "Please Turn the Page" may be substituted for "Press the Space Bar Please".

Learners have various and sometimes different needs and characteristics in learning. For example, Norman (1978) points out that learners develop a model about how to learn (meta-cognition) within the individualized instruction in which they find themselves. Such models may orient learners toward content selection, display selection or conscious cognitive processing.

Learner's control of learning and when to learn are some of the factors found to be most effective in various studies on enhancing learning (Merrill, 1985). Nevertheless, the degree of control would depend on the type of delivery system used and the level of sophistication of the design of the program. Some modular instructional models are limited to a low level of learner's control due to the characteristics of learners and the delivery system used. For example, in using printed materials, some learners would find it easier to learn through more straight-forward linear instruction than would be the case in branched instruction.

Complex branched instruction involves learners frequently altering between pages. Such a process tends to be tedious and may sometimes disrupt concentration and the smooth flow of an integrative sequence of learning. For example elementary school pupils need more simplified instructions at their level (Stromquist, 1981). Baker (1973) considers the approach to be a vehicle which generates sequences of instructional events to accomplish a specified change from initial competencies to specified terminal competencies. The more adaptable the program is to the learner's needs, the more effective it becomes (Gagne, et. al., 1988).

Types of Instructional Delivery Systems

The expressions "instructional technology", and "interactive modular instruction" apply to a broad range of specific learning designs which can be presented by various media. Such media include: computer based instruction; textbook delivered instruction; television based instruction; video based instruction; tape-recorded instruction; and laser video disc instruction (Russell, 1974; Russell and Johanningsmeier, 1981; Gagne and Briggs, 1988; Dick and Carey, 1985).

Lysaught and Williams (1968) very accurately contend that decisions about which delivery system to use in programmed presentations largely depend on the kinds of learning conditions needed to develop the types of student performance in light of predetermined goals.

Research on Interactive Modular Instruction

Interactive modular instruction research is offering a most promising approach for bringing about instructional metamorphosis in schools. Computer assisted instruction is one of the promising and imaginative developments in education, for the computer programs can offer extensive adaptive branching for higher levels of interaction.

Historically, many educators, instructional designers and educational psychologists have shown interest in examining various factors and conditions which can enhance effective learning through instructionally designed media. For example, studies on interactive modular instruction have shown some controversial results on the effectiveness of the approach.

There are studies which show that instructionally designed materials are effective at all levels of education including kindergarten and elementary schools (Singer, 1974; Marsh and Pierce-Jones, 1968). On the other hand, there are some studies which have not shown overwhelming effectiveness (Kantasewi, 1968; Hartley, 1978; Johnson, 1968). Inconsistent results from research on the use of modules in printed book delivery systems calls for more evaluative studies. For example other scholars contend that sometimes modular printed books are even better than a teacher (Grayson, 1982; Kulik, 1968; Porreca, 1974).

Some studies have reported that instructionally designed materials working together with teachers, produce better results, than either of the two working separately (Hartley, 1978). Based on very encouraging experimental results, many countries are continuing to carry out studies in schools and in correspondence programs (Flores, 1981; Cummings, 1986; IDRC., 1981).

Theoretical scholarship has also suggested the effectiveness of the approach. According to Skinner's (1954; 1968) theories, the approach can make learning easy if the designer can dismantle the subject material and reorganize it into a sequential chain of small units of knowledge, skills, and values.

Bruner (1966) and Block (1971) contend that learners can master even the most complex knowledge and skills effectively if the designer can develop the material in a coherent sequence according to learners' characteristics. Bloom (1968) suggests a theory based on providing enough time and appropriate types of individual help in guiding each student, rather than mass or group attention. Some studies have confirmed these theories. Anderson (1976) and Block (1971) reported the successful use of printed modular programs for students in Grades 8 to 14. Lloyd and Knutzen (1969) reported that self-instructional modules were superior to regular instruction for developing concepts and skills.

Merwin and Schneider (in Mudjiman, 1981) reported that their module was effective in increasing students' scores on higher cognitive level and questioning skills. Such studies confirm theories held among scholars and researchers that when modular materials are properly designed, they should stress the provision of cues, reinforcement, feedback, and promotion of practice.

On the other hand, Smith (1983) postulates that the difference in effective learning is more a function of different learning styles. Other theories suggest that effective learning depends on the rate of material presentation to learners or the frequency and contiguity of presenting the subject content to the learners. It also seems to depend on how learners practice the material; and the type and amount of reinforcement provided to and received by learners about the correctness of their responses (Lysakowski and Walberg, 1982; Gagne and Glaser, 1987).

Research in a variety of interactional settings is of particular interest to the present study. Several of these studies are reviewed below.

Begin (1981) and his group of researchers conducted a study relating to the above theories. They had experimental and control (regular classroom) groups in which they tested modules in the elementary school system in Quebec. The approach also required the observation of the behavior of students and their teachers. They followed the basic model of testing hypotheses with experimental and control groups. In general, they found that the experimental group compared well with the control group; thus the study confirmed the hypotheses in that:

1. Students in experimental groups developed certain basic reasoning capacity just as students in regular classrooms.

2. Students in experimental groups learned the material as well those in regular classrooms.

3. Students in experimental groups developed a higher self-esteem than students in regular classrooms.

4. Experimental students showed less anxiety than students in regular classrooms.

5. Experimental students showed more appreciation of school topics than students in regular instruction.

6. Students in experimental groups assumed more responsibility for their learning than students in regular classes.

7. Teachers in experimental classes took less time in teaching. They thus spent more time with individual students than teachers in regular classes.

8. In taking care of individual learners, teachers in experimental groups were less concerned about content. Instead, they were guiding and giving orientations to students, encouraging those whose motivation was low by showing students' progress in learning, and solving communication problems among students.

A few researchers have conducted similar studies in developing countries before adapting the instructional technology in their school systems. In most cases they used indigenous curriculum materials. For example, Zimbabwe was among the African countries which explored the introduction of the technology in schools in the early 1960's (Hawkridge, 1968).

In 1964, Zimbabwe started a center for modular instruction development in Zimbabwe. The major aim was to develop and try the modular materials in the Zimbabwe school system. They conducted a series of experimental studies, using locally written and published programs. Hawkridge (1968) reported that effectiveness in teaching and ability to motivate in such areas as problem solving and creativity were among their basic research questions. Programs dealing with simple contours, how people learn, and factory reform acts showed favorable results. Topics on attitudes showed that they were more effectively taught through discussions in which participants could voice their opinions rather than through modules. Other longer term and less rigorously controlled in-school trials of programs showed some inconsistent results. Hence they suggested further studies should be conducted in different countries and settings.

Other developing countries have been trying to adapt the technology in their school systems since the 1970's. Some of the countries include the Philippines, Indonesia, Malaysia, Jamaica, and Liberia, among others. Results from research studies in these countries have also been showing some inconsistencies in various disciplines at different grade levels (Cummings, 1986).

Cummings reported various studies conducted in some of the above mentioned countries on the development and use of the approach. For example, the Philippines conducted a study based on two disciplines in grade 4 and 5 in five schools. Each school received a set of English language modules; some received Mathematics, and others were given Social Studies. Results showed that pupils performed well in most disciplines. The results also showed a significant spread in achievement for upper level pupils, who also completed the modules earlier than lower level pupils.

Results from the Philippines study were encouraging and had cost-effect benefits. The study results achieved much international visibility. However, politicians and leaders of the Ministry of Education within the country remained skeptical about the approach. Hence the approach failed in gaining entry into their entire school system as a policy.

Another study (Mante, 1981) compared modular interactive instruction and conventional instruction. They used Mathematics, English language, and the native Philippine language with grade 5 and grade 6 students for the study. They had a total number of 690 experimental pupils, and 808 control pupils. They used academic achievement tests of the Philippine Educational Placement and Attitude Inventory to test the program. Although the study results showed significant differences in academic achievement in favour of the experimental group, the overall results were favorable for both experimental and control groups. The learning modes in the experimental group enabled students to gain as much knowledge, skills and positive attitude as those who received regular instruction.

Cientat (1981) and Cummings (1986) reported studies conducted in Liberia on the use of the modular approach for grades 1 to 6. The experimental design used five experimental schools, five status quo schools and five control schools supplied with conventional textbooks. Teachers who had attended a one year training program on the development and use of modules at the laboratory schools became the supervisors of the study. They received salaries three times higher than the teachers in the 15 schools of the study.

Such salary differences demoralized the teachers involved in the study. Many of them questioned the professional credibility of their colleagues based on a one-year experience at the laboratory. In general, post-test results showed the potential value of the approach in Liberia. Cummings contends that results of the study had a positive influence on educational practice in Liberia and in neighboring countries as well.

Jamaica is among the developing countries which tried to adapt the modular approach unsuccessfully in selected schools (McKinley, 1981; Cummings, 1986). The researchers experimented with grades 1 to 5 in Language and Mathematics. Results showed that teachers had developed negative attitudes toward the program. Due to teachers' negative attitudes, the program lacked leverage and some teachers abandoned the project. Many members in the community saw no signs of the promised improvement of the quality of learning in their schools. Test performance by grade 3 and 4 students in general skills, Arithmetic, and Language showed no significant difference between the experimental and the control groups. The results of the study showed that the approach was basically costly. It used the same number of teachers, and required a much larger volume of materials than the conventional approach. Eventually the project lost its political and government support from the Ministry of Education and the project was abandoned.

An Indonesian experience with the same approach for grades 4 and 5 had, to some degree, similar results as the Jamaican project. Indonesia realized also that the new approach was more costly than conventional instruction. Although the proponents of the modular approach continued advocating it for its high quality of instruction, the study results did not confirm their claims (Cummings, 1986).

Implications From Literature Review

Based on the review of the literature, the case for modular interactive instruction is encouraging. However, although there have been encouraging results in developing countries, there are still doubts among some scholars and politicians on whether to install the approach in an entire school system as an educational policy. The fear concerns whether the approach is capable of standing as an instructional approach for all students and all disciplines. They also fear that introduction of the approach would probably replace teachers (Trow, 1963).

Many of the studies reviewed seem to pay more attention only to workability and effectiveness of the programs. They do not identify specific factors which may influence the success or failure of the modular materials in achieving academic learning goals. Furthermore, many studies do not examine factors which can make the approach successful in gaining acceptance among pupils, teachers, educational administrators, and politicians.

The purpose of the present study was, therefore, to observe, describe and analyze some of the factors that would be important for consideration in introducing instructionally designed learning programs in Tanzanian primary education. The study examined factors such as : environment of the schools, type of instruction, teachers' and pupils' attitudes toward the program and identification of specific strengths and problems in introducing the program in Tanzanian primary education.

CHAPTER 3

PREPARATION OF MODULES

Structure of the Modules

The stimulus materials for this study consisted of three instructionally designed modules in Geography. The modules covered topics from the grade six curriculum. The first module dealt with the conceptualization and use of latitudes and longitudes in map reading. The second module was on major physical features of the world. The third module was on causes of climate and the major climate belts of the world, such as hot climate, cool climate and cold climate (Appendix B).

Details of the presentation within each module followed a structure and sequence recommended by Dick and Carey (1985), and Gagne et al., (1988) in the following order:

1. Pre-instructional Activities:

   a. advance organizers, which familiarize pupils on how to study the modular materials, the overall aim of the module, and an overview of the content.
   b. overall objectives of each module tied to the general goal of the program.

   c. specific objectives for each module.

   d. instructions on how to learn each module.

    e. instructions on the materials and facilities for use in learning the materials.

2. Subject-content in the following sequence:
    a. presentation of segments of information,
    b. open-end practice items for each segment,
    c. feedback answers for each practice item,
    d. multiple-choice test items for each module,
    e. feedback answers for each test item.
3. Follow-through activities:
    a. revision of each module for the self-test,
    b. feedback answers for each self-test item,
    c. a post test for each module.

In-service Instruction and Teacher's Guide

Teachers were provided in-service training on the use of the modules and how to supervise the sessions. The two teachers involved in the formative evaluation were given a seminar during the first week of July 1989. The four teachers and four observers for the study participated in a seminar in the first week of August, 1989.

The designer organized a seminar for the teacher and observer in each of the four schools. Teachers and observers were not aware that other schools in the study were using different treatment conditions (Teacher Assistance or Independent Study). In addition to the in-service training, a teacher's guide was written for each of the treatment conditions to describe the teacher's role (Appendix C).

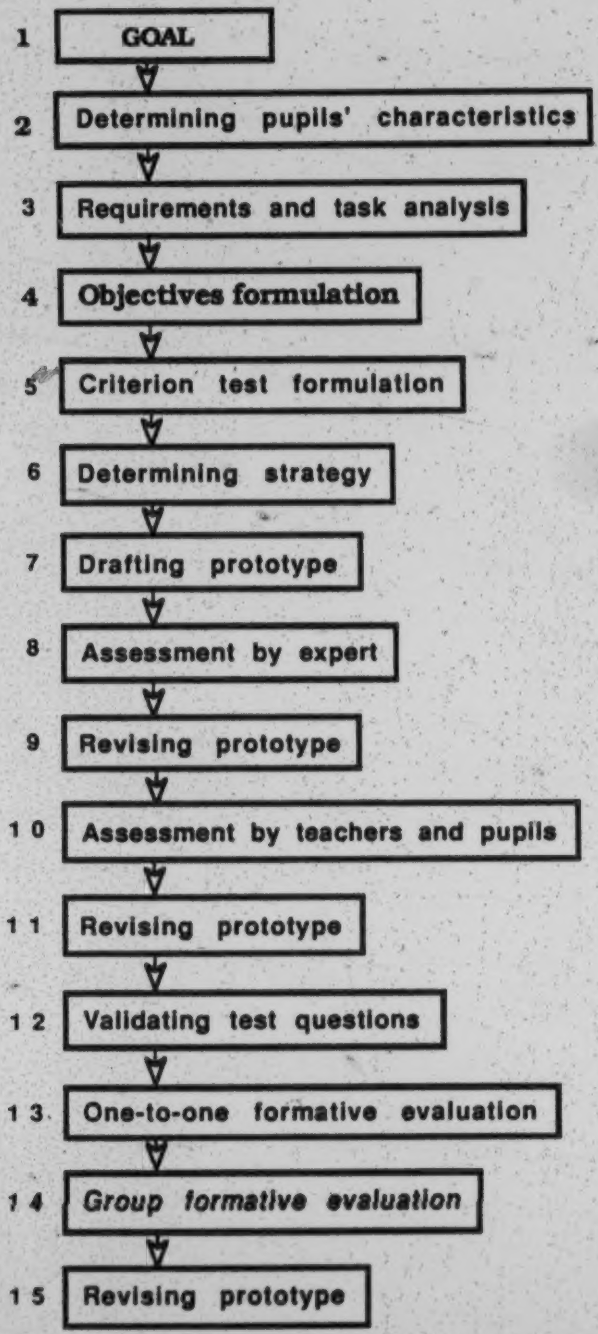
Stages of Developing Modules

The project consisted of six stages: (1) developing three modules using Geography curriculum guide, textbook, and atlases for primary education in Tanzania during January - May, 1988 . (2) an initial try-out (June - July 1988) for 20 Tanzanian pupils who were familiar with the topics used in the modules in order to provide well informed comments for improving them, (3) validation of the measuring instruments during the second and fourth week of June, 1989, (4) a one-to-one formative evaluation of a grade 5 pupil in June 1989, (5) formative evaluation with a group of 35 Grade 5 pupils in July 1989, (6) the study using 140 Grade 5 pupils and 4 teachers in August through November 1989.

Procedures Used in Designing Modules

In designing the modules, the designer followed accepted standards used by various instructional technology experts. The designer modified some ideas from various sources to suit current instructional design models. The main framework of procedures for developing the modules came from Dick and Carey (1985) and Gagne, et. al., (1988). The steps used in developing the modules fall under the following sequential categories: (Figure 2).

Figure 2.
Stages used in developing program


1 GOAL
2 Determining pupils' characteristics
3 Requirements and task analysis
4 Objectives formulation
5 Criterion test formulation
6 Determining strategy
7 Drafting prototype
8 Assessment by expert
9 Revising prototype
10 Assessment by teachers and pupils
11 Revising prototype
12 Validating test questions
13 One-to-one formative evaluation
14 Group formative evaluation
15 Revising prototype

1. Identifying an Instructional Goal:

This stage raised the question: **"what is it that the pupils should be able to do when they have completed the instruction ?"** To be able to answer this question, the designer studied the literature on learning difficulties of pupils in Tanzanian classrooms.

In addition the designer used the Tanzanian syllabus in Geography for primary education to derive the overall goals on the topics for the modular program (Omari, Mbise, Mahenge, Malekela, Besha, 1983; Omari and Mosha 1987; Wizara ya Elimu,1986).

2. Determining Pupils' Characteristics:

In this stage the designer identified pupils' characteristics and specific skills necessary for them to be able to learn the program. Various Tanzanian literature on primary education provided a major source of input for this activity.

The designer also used his previous experience in teaching primary school pupils. For example, primary school pupils have traditionally no experience in using a modular approach. Lack of such experience would require beginners to start with a simplified design.

3 Determining Requirements and Task Analysis:

This stage involved determining the type of learning skills required of pupils. The designer analyzed the goal from the syllabus to identify the subordinate skills for learning and procedural steps in learning the sub-skills.

4. Formulating Performance Objectives:

Based on instructional analysis, the identified entry behaviors and the sub skills identified in the instructional analysis, the designer developed specific objectives. The objectives reflected the type of learners, learning behaviors, conditions for learning the skills, and the criteria for successful performance.

Since the pupils had no previous experience in handling the new approach, the goal focused on cognitive skills such as recall of facts, comprehension and a few skills which required application in simple problem solving.

5. Developing Criterion Referenced Test Items:

Based on the specific objectives developed for the module, the designer developed test items. Practice items were developed for each segment of learning materials. After each practice item in the module learners were given a written feedback answer to compare with their own answers. Pretest items were designed. Post-test items were also constructed so pupils could be tested individually after completion of each module.

6. Developing an Instructional Strategy:

Using information from the five preceding steps, the designer developed instructional strategies. An instructionally designed workbook format was selected for a delivery system. The strategy included sections on pre-instructional activities, presentation of segments of information, practice items and feedback answers, and follow-through activities such as testing and revisions.

The printed materials contained segments of text and graphics such as various maps and figures. The strategy required pupils to engage in cognitive interactive skills and activities through reading segments of information and reading and responding to practice items for each segment.

In general, the designer developed the strategy on an informed basis from current results of instructional and learning research, current knowledge of learning processes, content for learning, and learner characteristics. These are features proposed by Dick and Carey (1985); Gagne et. al.,(1988); Russell, (1974); and Russell and Johanningsmeier, (1981).

7. Drafting the Prototype:

A printed material delivery system in modular format (workbook) was selected for development of the program for the project. The printed delivery system was selected because there are many printing facilities in the country while other delivery systems, such as computers and videos are quite scarce. The printed prototype modules included a learner's manual, instructional materials, tests, and a teacher's guide.

8. Assessment by Instructional Technology Expert:

The prototype was assessed by an expert (professor) in instructional technology. One of the major comments made by the expert was to conduct further trials with pupils and teachers. Another suggestion was to reorganize the structure of practice questions and answers to be on the same page rather than the answers being at the end of each module. In some cases the comments required editorial work.

9. Revision of the Prototype:

The materials were still at initial stage of development. Using the comments and suggestions made by the expert, the designer made revisions.

10. Assessment by Pupils and Teachers:

During June/July 1988, the designer conducted an initial assessment of the modules with 20 grade six pupils and four teachers. The major goal was to let the pupils, who had completed the topics through their regular program of studies, appraise the modular materials and offer criticisms and suggestions.

At this stage the designer used only teachers and pupils who showed an interest in assessing the materials on the assumption that they would assess them more seriously than reluctant participants. The designer asked them to provide criticisms and suggestions on aspects they thought could improve the modular prototypes. The assessment provided some insights on what to include in the study materials, and helped to determine the grade level of pupils for the main formative evaluation and the study itself (Appendix D).

11. Revision of the Prototype:

Based on the teachers' and pupils' suggestions, the designer made some changes. For example, it was decided to use the prototype with pupils who were nearing completion of grade five. Since the topics in the modules were from the grade six curriculum, the pupils would not have studied them. In this way the modules would show a more accurate picture of their effect on learning

Some changes made from teachers' and pupils' suggestions included changing reference page numbers for the atlas maps. The designer made such changes because the atlas used in preparing the modules had changed, and thus page numbers referred to in the modules were different from the new atlas. In addition the designer included more appropriate photographs to illustrate certain geographical concepts.

12. Validation of Measuring Instruments:

The designer developed achievement test items following the goals and general objectives of the Geography subject as stipulated in the Tanzanian syllabus (Wizara ya Elimu ya Taifa, 1975). Then the designer developed specific objectives from the general objectives in juxtaposition to the learning skills analyzed from the syllabus general sub-skills.

Multiple choice test items were 100 in total, of which 50 were for pretest, and 50 others were for the post-test. The structure of the test items followed the format used by the National Examination Council (Baraza la Mitihani la Tanzania, 1980). The regulations made by the Ministry of Education in Tanzania require multiple choice question format for all primary schools in the country.

The designer used a test-retest model with an interval of three weeks with 100 grade seven pupils. Grade seven pupils were selected for the purpose of validating the instruments because they had already completed the topics in the grade six curriculum. The designer avoided giving a clue to the pupils that he would come back to their school, lest they prepare themselves for any retesting. The results were then analyzed using the Pearson 'r' correlation statistical test (Moor, 1983,). Table 1 shows the correlation results.

TABLE 1.

Pearson correlation coefficients on the reliability of measuring instruments.

VARIABLE	CASES	MEAN	STD	CORR	P
Test 1	100	45.39	15.29	.862	.000
Test 2	100	46.43	15.48		

The results from Table 1 show that the correlation between the first and second test was very high (.86). Based on this very high correlation, one can conclude that the measuring items were consistent over time. However, Wiesma (1975), argues that reliability of a test is relative. He contends that an achievement test with a reliability of .65 might be undesirable if existing tests in the academic discipline have reliabilities in the .90's. Dyer (1979) suggests that a reliability coefficient of .75 should be the minimum level except when using a small sample size of less than 50 students where tests with reliabilities as low as .50 may still be acceptable

13. Conducting One-to-One Formative Evaluation:

During June, 1989, when schools were on holidays the designer required a pupil who had completed the first half of grade five in order to conduct a one-to-one tryout of the three modules. A typical pupil who lived with his parents near the designer's house was selected. The arrangement permitted the pupil to consult with the designer if he needed help and also enabled the designer to monitor his progress. The pupil had indicated an interest in participating. He agreed to use his spare time to work on the modules during holidays.

The pupil was given a pretest first, in which he scored 26% in total. Then he was briefed on how to study the materials. The designer informed the pupil that at the end of the program he would complete a questionnaire dealing with the program. The designer was in contact with the pupil frequently to see how he was progressing and whether he had any problems with the study materials requiring immediate attention.

However, since it was time for school holidays, the designer found that most of the time the pupil's friends interrupted his studies in playing games. Hence the major problem was how to get him to spend enough time in studying the program.

By discussing with the pupil and his parents, it was agreed to make a daily time schedule which would allow him to concentrate on working on the program, as well as giving him time for play with his friends. With the new arrangement he spent most of the mornings at home working on the program. In some cases during the evening he went to his father's office where he continued working on the program. In this arrangement, the pupil continued working well on the program.

While working at his own pace, the student required approximately 37 hours to complete the three modules. This is an average of 1 hour and 15 minutes over a 30 day period. The time record provided the designer with an estimation of time needed for studying the materials. The pupil scored 76% on his post-test. On the basis of the results and the pupil's comments the designer made changes in the level of language. Although the pupil's performance scores and attitude toward the program indicated the modules were effective they needed further evaluation with a larger group.

14. Group Formative Evaluation:

The designer requested a class of 35 grade five pupils from the Head Teacher in one of the primary schools. In order to ascertain that in every session there was a teacher in the class, the designer requested the Head Teacher for two Geography teachers. The teachers were asked to help each other alternatively in supervising the class. By having two teachers it was possible to avoid situations where a class had no teacher when one of them was called for other emergencies such as sickness or urgent duties.

The selected group of pupils were given a pretest. The designer next conducted a seminar for the pupils. In addition the designer conducted a seminar for the two teachers who were responsible for supervising the class and giving individualized instructional assistance to students who needed help.

The pupils who were beginning the second term of grade five started the first module in the second week of July 1989 and completed the three modules by the end of the month. They had six sessions a week. In each session they spent 1 1/2 hours. Each pupil studied it at his/her own pace. Before continuing to the next module, each pupil had to take a post-test of the completed module. The teachers recorded the daily events and the time spent in each session. In calculating the time spent in studying all three modules to completion it was found that the average time spent was 27 hours.

The presence of teachers during the sessions facilitated additional individualized instructional assistance for those who needed help. Hence pupils spent less time than during the one-to-one formative evaluation. The designer attended most of the sessions to watch the pupils' progress.

At the end of the program, pupils were given evaluation forms for the three modules. Table 2 is a summary of tne results from pupils' attitudes toward the modules. The table reveals that a high percentage of pupils reported positive attitudes toward the program.

Dick and Carey contend that these types of evaluation provide the designer with information for improving the instruction during its development. Russell (1974) points out that the purpose of evaluation is to measure and predict the success of a module. Thus, the basic question to ask is: who learns what, under what conditions, and in how much time?

TABLE 2.

Pupils' attitudes toward the program

Key: A = strongly agree; B = agree; C = not decided;
D = disagree; E = strongly disagree.

TYPES OF RESPONSES	A	B	C	D	E
Liked the program	17 (49%)	10 (29%)	6 (17%)	0 (0%)	2 (5%)
Program understandable	14 (40%)	13 (37%)	3 (9%)	5 (14)	0 (0%)
Other subjects be modules	19 (54%)	11 (32%)	5 (14%)	0 (0%)	0 (0%)
Found good progress	10 (29%)	25 (71%)	0 (0%)	0 (0%)	0 (0%)

Table 3 shows the pre-test and post-test results. The results show there was a significant difference between the two tests (.0000) indicating a relatively high impact of the modules on learning.

TABLE 3

Group formative evaluation using a 't'-test

VARIABLE	N	MEAN	STD.	T-VALUE	P-VALUE
Pretest	35	24.57	4.79	26.36	.0000
Post-test	35	69.31	8.82		

15. Revising the Modules:

Gagne et. al., (1988) and Dick and Carey (1985) suggest that the designer should collect data from the formative evaluation and analyze it to identify difficulties experienced by learners in achieving the goals. The identified difficulties should relate to specific deficiencies in the instruction for further improvement.

In respect to the teachers' and pupils comments and suggestions made, the designer revised the study materials and made all the test items in multiple choice format to conform with the national examination standard format for primary schools. He also added some map information to the modules and reduced the attitude questionnaire items in number. They were then structured in Likert-scale format.

CHAPTER 4

RESEARCH METHODOLOGY

The Working Theoretical Framework

This theoretical framework served as a guide for the researcher to focus upon particular areas of investigation on modular interactive instruction. The framework emanates from theories and educational practice dealing with instructional technology and learning. Specific concepts and constructs are used in formulating criteria for assessing the role of modular interactive instruction in learning.

Modular interactive instruction is basically a learner-centred approach to instruction. It focuses on the activities of the student rather than on teacher activities. The role of the teacher may be important to the success of modular instruction at the elementary education levels. It is the role of the teacher to arrange and maintain conditions conducive to pupils' achievement in learning the program. In mass teaching methods, pupils spend much of their time listening while the teacher spends much of the time talking. There is very little opportunity for learners' overt response.

Due to large groups of students, the teacher has limited opportunity to attend to each learner. The following are four major points which guided the design of this study:

1. One of the reasons for the effectiveness of modular interactive instruction is what Heinich et. al., (1982) describe as the

"failure-proof" design. The technology is capable of guiding a majority of students to learn according to the objectives established in the program itself.

2. Some theories from educational psychology suggest that the environment of the school has an effect on learning. For example, an intellectually rich environment would stimulate and enrich learning capabilities and aspiration reinforced by expectations of obtaining what is available from the environment (Lefrancois, 1982).

The above theory seems to suggest that the urban environment would enhance learning as it is surrounded by rich learning factors such as public mass media, public libraries, many book and stationery stores, large schooled community, good role-models of people whose gainful employment is the result of schooling, and the encouragement and guidance by parents for their children's higher aspirations (Neuman, 1986).

On the other hand, in rural areas in Tanzania, the academic environment is confined to school premises which are limited to textbooks, chalkboards, and exercise books. The teachers are viewed as white-collar career models. The community exists on peasantry farming and has a literacy education. Hence, in the light of this understanding, the researcher assumed that such factors were either accessible or inaccessible to the pupils and teachers depending on the location of the school.

Although the rural community has adult education programs available, in most cases it does not transcend reading and writing skills. It is expected that the adult rural population will learn from their schooled children. One does not expect much learning due to a lack of stimulation in the rural areas. Even farming methods have not kept up with current practices but are much like they were many years ago. The only source of knowledge and aspirations the community gets is from the teachers.

Since the modular approach is capable of guiding all learners to interact with the learning materials and thus the design is self sufficient for individual self study, one would expect that the differences between urban centers and rural areas described above would not affect learning from interactive modular programs given equal entry levels.

3. Modules have been successfully used in all levels of education--from elementary school through adult education in almost every subject area. If the instructional design and management are well designed and carried out successfully, one would expect to find no significant difference in academic achievement among groups. Groups of students who learn the program with teachers' instructional assistance and those groups who learn the same program without teachers' help would perform equally well. (Clark, 1983).

   The materials can be used to teach an entire course or a segment of a course without teachers' direct instructional support. On the other hand, evidence indicates that modules and teachers working together produce better results than either of the two working separately (Hartley, 1978). The teacher's role in this case would not be the same as that in a traditional direct classroom instruction. The teacher assumes a new role as discussed under a section below on re-definition of roles.

4. Consistent with the theory of reinforcement, many scholars agree on the effectiveness of immediate feedback (Gagne et. al., 1988; Bruner, 1971; Lefrancois, 1982). Heinich et. al., (1982) point out that the backbone of Skinner's theories was reinforcement. Skinner hypothesized that the results of a response determine whether it will be learned.

   Basic to reinforcement theory is the notion that complex knowledge and skills can be broken down into clusters of simple behaviors. Each behavior is learned, one at a time, through skillful arrangement for immediate reinforcement after each correct response. These simple behaviors then become links in a longer, more complex behavior chain. It requires presentation of one segment of learning material at a time, followed by an immediate problem solved response and, finally, provision of immediate feedback. If one makes errors, the program then automatically helps the learner to correct them. Immediate knowledge of the correct response provides reinforcement and motivational interest in learning.

Along with reinforcement and motivational power, modular interactive instruction is claimed to be a pedagogical approach which provides alternative materials and media for easy adjustment to varying learning capabilities and learning styles. To this effect, Postlethwait (1978) proposes that learners are individuals and the aim of instruction is to help individuals who have diverse characteristics, needs, interests and capabilities. Based on these observations, one would expect to find considerable evidence of positive attitudes toward the program. It is hoped that all pupils who use the program will show a high positive attitude in the Likert- scale measure, supported by significantly higher performance on the post-test. On the basis of this assumption, one would expect to find no significant difference in attitude toward the approach among groups under different instructional or environmental treatments.

Methods of Introducing Modules

The rationale for introducing modular instructional approach in the Tanzanian primary education system depends on: (a) assumed capability of modules' effectiveness in learning; (b) accessibility of facilities related to the technology; and (c) learners' and teachers' positive attitudes toward modular materials.

Some earlier studies on instructionally designed learning materials have suggested that the application of modules in a school system are easily performed in the classroom during regular periods (Lysaught and Williams, 1968). An advantage is that each learner gets his/her own materials to learn and a teacher is available for individual learners who may seek additional instructional assistance. Administrative and instructional assistance can be provided should the learner encounter difficulties with the study material.

Instructional technologists (Dick and Carey, 1985; Gagne, et. al., 1988) recommend that the materials should contain a clear guide and objectives for using the packages. The guide provides direction as well as prepares learners for proper handling of the study materials.

Specification of Roles

Through gradual application of modular instructional materials, learners and teachers may realize the effectiveness and importance of the approach. At a stage when the innovation starts gaining acceptance by teachers, learners, educational developers and administrators, the need for defining the role of these parties becomes important. It is most important that the teachers' and learners' roles are specified before the initiation of the program. The following role descriptions represent a consensus of practices commonly reported in implementing modular instructional materials.

Learners' Role

Unlike conventional instruction, the learner assumes a direct interaction with the instructionally designed material. Thus the learner is not only expected to master the subject material and the intellectual skills, and have positive attitudes as well, but is expected to take an increasing responsibility for his or her own learning.

Through designer's carefully determined sequencing, active involvement and reinforcement, the learner becomes a partner in the development of his or her own success. Interacting with the study materials, a learner can discover ways of becoming more successful. This becomes a shared responsibility among program designers, teachers and learners.

Teachers' Role

In using modules, a teacher assumes a role of a manager in implementing the interactive modular instruction. The approach is not to replace a teacher or to force the teacher out of a job. Instead it enhances the learning process. The teacher is there to provide personalized tutorial assistance to individual learners who may need help.

If learning tasks can effectively and efficiently be accomplished by the use of modules, then learners should use the modules to learn. The classroom teacher should concentrate on the things that the modules cannot do (Russell and Johanningsmeier, 1981; Russell, 1974).

To this context, the teacher plays the role of counsellor, guide, assistant and stimulant. The teacher provides personalized instructional assistance to each learner needing help at a specific stage of the learner's progress. In addition the teacher performs the administrative role in organizing learners in studying the material and providing any other system support to the program. For learners who finish a module earlier than others a teacher may provide the next module and allow them to continue working. However, the instructional modular designers' goal would be to limit the need for teacher's intervention as much as possible.

Modules' Role

In conventional teaching methodology, the material learned is drilled into the learners in the form of mass lectures or delivered through chalk-and-talk methods. The teacher and the traditional textbook become the direct source of the learning material. Through the teacher's chalk and talk, or lecturing, all learners are placed together and finally examined to determine whether they can pass exams as an index of their capability in learning.

Some conventional teaching methods stress the need for the teacher to engage in questioning behavior with the students in order to develop answering skills. This provides some interaction and deserves to be recognized. It should be noted that a teacher can involve only one student at a time, thus many students remain passive observers. Hence, the modules' expected roles are:

a. to provide significant input. The nature of the design presents the materials in a series of open segments in gradual steps moving learners from a familiar background of factual knowledge to complex principles, and understanding,

b. they must engage in stimulus presentation of the items in accordance with stated measurable objectives,

c. they should be able to elicit the required response on the part of learners, and

d. they must supply immediate feedback to the learner about adequacy and correctness of responses. In so doing, they should offer reinforcement on the basis of feedback (Dick and Carey, 1985; Jonassen, 1985; Gagne and Briggs, 1979; Gagne, et. al., 1988; Russell and Johanningsmeier, 1981).

THE ORGANIZATION OF THE STUDY

Selection of The Schools

The researcher surveyed ten schools in the city and rural areas of Dar-es-Salaam in Tanzania to select suitable ones for the study. Suitability of the schools for this study was in respect to the following criteria: rural versus cosmopolitan factors; schools which the researcher could easily access in order to provide instructional materials and daily supervision. The four selected schools are described as follows:

a. Urban Schools.

The city of Dar-es-Salaam is a densely populated commercial and industrial area of a cosmopolitan nature. Asians and rich native Tanzanians own most of the commercial businesses. Most of the population in this area completed education programs through formal schooling or in the adult education system.

The city has seven secondary schools. Four of these have grade nine to twelve, and three have grade nine to fourteen. There are five colleges within the city, including: a Technical College, a Business College, a Teachers' College, an Accountancy and Auditing College, and an Institute of Finance and Management. There are also four hospitals, four health care centers and many dispensaries in the city. One of the hospitals is a national consultant medical center.

The two urban schools selected for the study have similar factors. Both of them are at the city center; they are about one kilometer apart from each other; they both have grades one to seven. They have neither play grounds nor land for school farming. Buildings in the area are mainly for private commercial business, government and affiliated organizations offices, and private factories and industries. Close to the two schools there is a national public library which is used by both teachers and pupils for reading and borrowing books.

Each school has two school radio sets for curricular school broadcasts. Neither school has a school library. Both schools have a few copies of school textbooks for each subject, which pupils share. Some parents buy textbooks for their children. Neither school has a formal and consistently organized way of getting newspapers for school use. Some teachers buy them for their own personal reading. Some pupils read Swahili newspapers in their homes.

The school timetables include: classroom curricular sessions which take the major part of the school time, and religious sessions twice a week. Church Ministers for each denomination conduct the Religion sessions. Since neither school has playgrounds or land for farming, they have neither formalized sessions for games and sports nor for agricultural activities although such activities are promoted in the curriculum guides.

b. Rural Schools.

The school communities grow rice, legumes, cassava, sweet potatoes, coconut, oranges, pineapples, bananas, and mangoes. Apart from their home consumption, they sell some of their produce to small village markets. The schools have land for gardening, farming and play grounds. They have agricultural subjects and apply the theory in gardening and growing crops for marketing to raise school funds.

There are a few small village grocery stores in both communities. In each community there is a public dispensary near the school. Most of the community people attend adult literacy classes. In general, the teachers and dispensary workers are among the few people with employable formal education.

The two rural primary schools are quite similar to one another. They both have grade one to seven. Whereas one of them is 16 kilometers from the city, the other one is 15 kilometers away from the city. Each school is within an agricultural community with many surrounding villages.

In each school there is one school radio for school broadcasts. In most cases the schools do not access school broadcast sessions. There is no school library in either school. There are no textbooks for pupils in many subjects, including Geography. However, teachers have some copies of text books for each subject. There are very few pupils who have textbooks bought by their parents.

Neither school receives newspapers for their school. In rare cases teachers may buy newspapers when they happen to go to the city. Unlike the city schools, there is no public library in either community. There are neither secondary schools nor colleges in either community. In the light of this environment, pupils depend very much on listening to their teachers to learn school subjects.

Stimulus Materials (Modules) and Research Instruments

The researcher used the English language in preparing the stimulus materials and research instruments which were then translated into the Swahili language. Swahili is the medium of instruction in primary schools in Tanzania. The following were the research instruments and stimulus materials used in the study :

1. Three instructionally designed modules were used as the main stimulus materials in the study. They were packaged as workbooks designed for individual study. The packages included study materials, self-test questions and multiple choice examination questions (Appendix B). The design of multiple choice examination questions (post-test) followed the Ministry of Education regulation for primary school exams in Tanzania. Some of the questions came from previous final exams. Pupils achievement on these questions represented the dependent variable for the experimental study

2. Seminar presentations for teachers. The presentation for teachers supervising independent study groups focussed on their providing administrative services only. It was stressed that provision of any instructional assistance to pupils was prohibited. On the other hand, the seminar presentation for teachers who supervised instructionally assisted groups focussed on providing both administrative and instructional assistance to pupils (Appendix C).

3. Forms (logbook like) for teachers and observers use in recording classroom events including administrative matters during sessions (Appendix E).

4. Seminar presentations for pupils. The presentation for pupils in independent study groups focussed on how they would consult teachers on administrative matters only and encouraged them to study the modules independently without seeking any instructional assistance from their teachers. On the other hand, the seminar presentation for pupils who were placed under instructionally assisted groups focussed on how they might study the modules with teachers individualized administrative and instructional assistance (Appendix F).

5. Evaluative forms for pupils were prepared. These forms were given at the end of studying all the modules. The forms focused on pupils' attitudes toward the program. They included various aspects such as: subject content, instructional design, clarity of text and graphics. The structure of the questionnaire used a five point Likert-scale except for one item which was in a multiple choice format. The Likert-scale items ranged from strongly agree, agree, not yet decided, disagree to strongly disagree (Appendix G).

6. Written questions were prepared to guide teachers in describing their experiences in using the modular approach, including related administrative matters (Appendix H).

Sample Size of the Study

The researcher conducted the study with grade five pupils in four separate primary schools. This was appropriate since the pupils had now completed much of their grade five curriculum and it was assumed they would be able to manage the requirements of the modules, although the content of the modules is included in the grade six Tanzanian curriculum. Two schools were in an urban area and two were in rural areas. In each school there are several streamed classes at each grade level. Four schools had grade five classes (streams) with equal numbers of 35 pupils each. One teacher from each school was included for the study.

It was from this equality of the size of groups that the researcher picked an intact grade five class of 35 pupils from each school for the study. A total of 140 pupils and 4 teachers were involved in the study. The study was conducted from the first week of August to the end of November, 1989. The pupils took a pre-test in the first week of August, 1989 to find out whether the four groups in the study were of equal academic ability. Table 4 provides results of the pre-test in the four schools.

TABLE 4.

Scores on pre-test academic ability in four groups of pupils.

SUB-POPULATION	N	MEAN	STD.	F	P
Rural School 1	35	16.7	3.72		
Rural School 2	35	16.6	4.54		
				.048	.986
Urban School 1	35	16.9	3.92		
Urban School 2	35	16.5	4.48		
Entire Population	140	16.7	4.14		

The test items were 50 in total. Each question was worth two points. Thus, a total of 100% for all the 50 questions. The overall picture of the means and standard deviation of the four groups in Table 4 showed that pupils were unfamiliar with the study materials. In essence, it was an indicator that they had not studied the topics before. On the basis of the ANOVA results the four groups were not uniquely different in academic ability ($F=.048$' $p<.986$).

Figure 3 illustrates the organization of the study. The figure shows the four groups in respect to the two independent variables investigated.

Figure 3
Organization of the Study

	ENVIRONMENT	
METHOD	**35 PUPILS** **Rural School 1** **Independent Study**	**35 PUPILS** **Urban School 1** **Independent Study**
	35 PUPILS **Rural School 2** **Teacher Assisted**	**35 PUPILS** **Urban School 2** **Teacher Assisted**

Strategy of Data Collection

The overall purpose of the project was to try to answer the five research questions presented in the first chapter of this dissertation. The research questions guided the development of the null hypotheses used in the statistical analysis. The following are the four null hypotheses postulated for the study:

Null Hypothesis 1.

> There will be no significant difference in achievement results in the test between rural and urban primary school pupils.

Null Hypothesis 2.

- There will be no significant difference on achievement results in the test between groups of pupils using the modules with teacher's individualized instructional assistance and those who will study the same program independently.

Null Hypothesis 3.

There will be no interaction effect on measurement results between the environment of the schools and the method of instruction used in studying the program.

Null Hypothesis 4.

There will be no significant difference in pupils' attitudes toward the program on the basis of environmental and instructional management.

Specifically the purpose of the present study was to observe, describe, and analyze some of factors for consideration in introducing instructionally designed learning programs in Tanzanian primary education. The researcher used three modules on a Geography topic with 140 grade five pupils.

The study used two independent variables, namely: environment of the school, and method of instruction. In addition, possible interaction effects of the independent variables were analyzed. Data which interpreted the pupils' achievement results was the dependent variable.

- The first variable was an investigation of whether success of the instructionally designed modules would depend on the environmental factors of the school. Study into this variable involved having two schools located in a city center and two schools located in rural areas. Investigation of this variable required an analysis of the students' achievement scores representing the two environment using an ANOVA at .05 level of significance.

The second variable focused on whether success of instructionally designed modules would require instructional assistance from the teachers. Study into this variable involved one group of pupils studying the modules under teachers' individual instructional and administrative assistance. Another group used the same program with teachers' administrative assistance only. Investigation of this variable required an analysis of the students' achievement scores representing the two instructional approaches using an ANOVA at .05 level of significance.

The study was also designed to determine whether there was any interaction effect between the environment of the school and the type of instruction used in studying the program. Investigation of this variable required an analysis of the achievement scores from the four groups using an ANOVA at .05 level of significance.

Teachers, observers and pupils completed an in-service program on their respective roles within the program. The researcher provided in-service and sessional conferencing for teachers in respect to roles for each group. An in-service program for pupils focussed on how they were going to study the program. The in-service program for teachers focussed on how they were going to supervise the classes. Those who were selected to supervise independent study groups were instructed on administrative roles and advised not to provide students with any kind of instructional assistance.

Teachers who were selected for the instructionally assisted groups of students were instructed to provide administrative service for all students and advised that they could provide individualized instructional assistance whenever needed. An in-service program for observers focussed on how and what they were going to observe and how they should record events using the log forms which were provided. (Appendix E)

Teachers who supervised independent study groups had their seminar on a different day from the seminar conducted for teachers who supervised instructionally assisted groups of pupils.

The two groups of teachers were not informed on the differences of program management. Due to isolation of the schools and seminars, both teachers and pupils were unaware of what was happening in the other schools under a different type of instruction. Hence, with such seminar organization it was possible to standardize teacher implementation of the instructionally designed modules. The researcher made scheduled visits to observe and provide assistance as requested on the administration and use of the materials (Appendix I).

All pupils started the first module during the first week of August, 1989. It was anticipated that each module would be completed in one month. Each module was studied three hours a week. The research project utilized two double period sessions. Each session used 90 minutes (one and a half hours). Pupils varied in reading comprehension. Each student studied at his/her own pace and took an exam (post-test) individually after finishing each module.

The researcher compiled the test results for further computation and analysis. Due to irregularities in pupils attendance in the schools the research project extended to four months instead of three months as had been planned, to allow all pupils to complete the program. Hence the program was completed by the end of November 1989.

Consistent with self-pacing study materials, pupils are expected to complete working on them at different times. The approach accommodates slow learners and those who may miss attending some sessions to catch-up. Hence, finishing is more important than rigid timing.

Teachers' and Pupils' Attitudes Toward the program

An additional important part of the study focused on whether teachers' and pupils' attitudes toward the modular approach related to the environment of the school and method used in studying the program.

Pupils' Attitudes

To collect data for this variable, pupils used questionnaire forms on attitude at the end of the program to report their experience on working with the program (Appendix G). Investigation of this additional factor required an analysis of the quantitative data from the four groups of pupils using an ANOVA at .05 level of significance.

Teachers' Attitudes

Teachers were given questions to answer by describing in short essay form their experiences and observations on the use of the program in their respective groups. The descriptions were in detail analyzed qualitatively in Chapter 6.

The fifth research question was addressed through gathering descriptive data and assembling an overall picture of the results of the entire project. These observations are detailed in Chapter 6.

CHAPTER 5

QUANTITATIVE DATA ANALYSIS

Environment, Method of Instruction and Interaction

The results of the quantitative data analysis for each null hypothesis and its related research question are discussed below.

Research Question 1

> Is the environment of the school a determining factor in the successful implementation and use of modular materials in effective learning?

Null Hypothesis 1

> There will be no significant difference in achievement results of the test between rural and urban primary school pupils.

The above research question was aimed at determining whether the use of instructionally designed programs is related to the unique environment of individual schools. Study into this variable involved collecting and statistically comparing data between rural and urban schools.

Lefrancois (1982) suggests that an intellectually rich environment stimulates and enriches capabilities and aspirations. The urban environment in which the present study was conducted had various intellectually stimulating facilities.

Table 5 is a summary of test results for students by environment and method of instruction using an analysis of variance with repeated measures.

TABLE 5

Test results by environment and method of instruction: --analysis of variance

BETWEEN SUBJECT FACTORS	SUM OF SQ	DF	MEAN SQ	F	P
ENVIRONMENT:					
Rural. vs Urban.	1412.99	1	1412.99	18.6	.001
INSTRUCTION:					
T/ Assist..vs Indiv.	42.38	1	42.38	56.0	.456
INTERACTION:					
Envir.x Instruct.	207.40	1	207.40	2.74	.100

The hypothesis for the above research question predicted there would be no significant difference in test scores between rural and urban schools. Table 5 provides support for rejection of the null hypothesis (F = 18.6, p<.001), in that urban pupils scored significantly higher than rural pupils. This suggests that environment of the school is a factor which has an effect on pupils' learning instructionally designed modules. In essence, the evidence suggests a conclusion that urban pupils in Tanzania would benefit more from the modular approach in Geography lessons, than their counterparts in rural primary schools.

Table 6 is also a summary of test results for students by environment and method of instruction. When one considers the overall picture of the test results in Table 6, one finds that the mean score of the entire population was very high compared to the pass-mark used in Tanzanian primary schools. The entire population scored at an average of 75%. The acceptable pass-mark for primary education in Tanzania is 50%.

TABLE 6

Test results by environment and method of instruction

CATEGORIES	MEAN	STD	CASES
Entire Population	75.4	12.8	140
Teacher Assisted	76.1	12.1	70
i). Rural	70.0	11.2	35
ii). Urban	82.2	9.7	35
Independent Study	74.8	13.5	70
i). Rural	71.9	13.3	35
ii). Urban	77.6	13.3	35

On the basis of this acceptable pass-mark, one would conclude that all pupils had passed the program exam. The test results thus support Heinich et. al., (1982) who remarked that individualized modular instruction can enhance learning for every individual student. Since the mean score for rural primary schools alone was 70.9% and the mean score for urban schools was 79.9%, it suggests that the approach was, to some extent effective, with rural pupils as well. Hence, although the urban pupils would benefit more out of the modular approach in Geography lessons, the approach should be considered as being effective with both urban and rural school participants.

Research Question 2

> Do primary school pupils in Tanzania who study instructionally designed modules with teachers direct individual instructional assistance differ in achievement when compared to those who only receive administrative assistance?

Null hypothesis 2

> There will be no significant difference in achievement results of the test between groups of pupils using the program with teachers' individual instructional assistance and those who study the same program individually.

The above research question was an investigation of claims put forward by some scholars that printed instructional modules are capable of teaching pupils without necessarily requiring the presence of teachers' individualized instructional assistance (Grayson, 1982; Porreca, 1974; Kulik, 1968).

On the other hand, research has shown that instructionally designed programs, together with teachers' instructional assistance would produce better results than either of the two working separately

(Hartley, 1978). The hypothesis for this question predicted that, there would be no significant difference on the measurement scores between the group which studied the program under teachers' instructional assistance and those who studied the same program independently.

Tables 5 and 6 reveal support of the hypothesis in that, there was practically no difference favouring pupils using the program with teachers' instructional assistance over those who studied the program independently. This result suggests that printed modules are effective in learning without necessarily having additional instructional assistance from the teacher.

However on the basis of standard deviation results in Table 6, there is a trend which shows that pupils who studied the program independently spread more away from the mean score than those who had teachers' instructional assistance, irrespective of the environment of the school.

The presence of a teacher is important for administrative purposes. In addition to administrative duties, teachers would use the time for other school work, such as marking, while supervising the sessions. However, since there was an indicator signifying the importance of teachers' instructional assistance, such pointers should not be overlooked. Teachers will still need to consider situations as they unfold to help those who would necessarily need individual instructional assistance.

Research Question 3

> Does the combination of environment of the school and the type of instruction used in studying modular programs, have a unique effect on achievement results?

Null hypothesis 3

> There will be no interaction effect on measurement results between the environment of the school and the type of instruction used in studying the program.

The above research question was to find out whether the combination of the environment of the school and the type of instruction used in studying the program would have a significant effect on achievement results. Marjoribanks (Keeves, 1988) points out that when conducting research, we usually want to know which of the factors we manage affect the outcome to the greatest level. Marjoribanks further suggests that researchers should not only examine the possible influences of the given factors, but design studies which analyze the possible effects of interactions between the given factors.

The researcher had some questions in mind regarding the interaction of variables. Were the achievement differences produced by environment of the school the same, or different, between pupils who studied the program with teachers' instructional assistance and those who studied it independently ? Or conversely, were the achievement differences produced by the two types of instruction the same or different for pupils in urban and rural schools?

Results in Table 5 provide support for the hypothesis in that there was no interaction effect between the environment of the school and the type of instruction used in studying the program (F = 2,74, p < .100). This is to say that, the two independent variables were independent of each other on effecting learning. Whereas there was no significant difference in test results between pupils who used the program with teachers' instructional assistance and those who used it independently, the unique difference appeared between the test results of the urban and rural schools.

Pupils' Attitudes toward the Program

Research Question 4

> Will the environment of the school and the type of instruction have any significant bearing on pupils' attitudes about the study of modular programs?

Null hypothesis 4

> There will be no significant difference in pupils' attitudes toward the program on the basis of environment or instructional management.

Various studies have reported on the motivational effect of modular programs (Begin, 1981; Mante, 1981). Mante reported that nearly all grade five and six pupils who used modular programs in languages and social studies developed a positive attitude to these subjects.

Other scholars have made similar remarks (Heinich et. al., 1982; Gagne, and Briggs, 1979; Bruner, 1971) that if instructionally designed materials are properly adapted to the learners and are carefully administered, they can cultivate a climate of interest for learners. They point out that the aspect of receiving immediate feedback for correct and incorrect responses increases motivation for many students.

The above research question was an attempt to find out whether the attitudes of pupils toward the program would have a significant bearing on the environment of the school and the type of instruction used in studying the program. The hypothesis for this research question predicted there would be no significant difference in attitude measurement results between the groups of pupils on the basis of environment of the school and type of instruction used in studying the program.

To find out the nature of responses from the pupils about their attitude toward the program the researcher analyzed the data obtained through a Likert-scale questionnaire by the use of the Analysis of Variance statistical test.

Tables 7 provides evidence in support for this hypothesis in that there were no significant differences ($F = 1.93$, $p<.15$) among the four groups due to the restriction of the range of the attitude measure.

TABLE 7

Pupils' attitudes toward the program:--Analysis of Variance

SOURCE OF VARIATION	SUM OF SQ	DF	MEAN SQ	F	P
Main Effects	.553	2	.276	1.93	.149
i). Environment	.540	1	.540	3.77	.054
ii).Instruction	.011	1	.011	.08	.783

Data in Table 8 confirm that there was very little difference in the attitude of pupils on the basis of type of instruction (teacher assisted or independent).

TABLE 8

Pupils' attitudes toward the program by type of instruction and environment.

VARIABLE	VALUE LABEL	N	MEAN
INSTRUCTION	**T/assisted**	68	1.162
	Rural	33	1.121
	Urban	35	1.200
INSTRUCTION	**Independent**	70	1.143
	Rural	35	1.057
	Urban	35	1.229
ENVIRONMENT	**Rural**	68	1.089
	T/Assisted	33	1.121
	Independent	35	1.057
ENVIRONMENT	**Urban**	70	1.215
	T/Assisted	35	1.200
	Independent	35	1.229
For the Entire Population		**138**	**1.152**

Although the results revealed no significant difference between the urban and rural groups, the data in Table 8 suggests that rural pupils were slightly more positive in their attitude toward the program than urban pupils.

Table 9 shows pupils responses relative to different reasons for liking the program. For example, 95% of them indicated satisfaction with the progress they made in the program. The results support teachers' opinions which indicated that pupils displayed positive dispositions after they became acclimatized with the program.

TABLE 9.

Types of pupils' attitudinal responses

TYPES OF RESPONSES	CASES	AGREE	DISAGREE
Found good progress	134	127(95%)	7(5%)
Liked the program	136	118(87%)	18(13%)
Program understandable	138	117(85%)	21(15%)
Like modules in- other subjects as well	136	112(82%)	24(18%)

Table 9 indicates that nearly all pupils in each group liked the program. This evidence suggests that pupils' positive attitudes toward the program was not significantly influenced by the environment of the school or the type of instruction used in learning the modules.

CHAPTER 6

QUALITATIVE DATA ANALYSIS

Description of Observational Data

The researcher worked with teachers and pupils to experience and have better insight into the entire process of implementing the program. In so doing, it was possible to collect data on the study that would not have been possible in any other way.

The insight and reflection one gains from a study that includes human behavior and attitudes requires interaction between a researcher and the participants. This is one way of experiencing a phenomenon and being in a better position to describe and analyze it. A variety of qualitative methodologies were employed to uncover features which were not evident within the formal statistical hypotheses. Qualitative data was gathered through (a) direct researcher observation, (b) teacher log-books (c) teacher and observer questionnaires (which resulted in essay-type responses), (d) researcher dialogue with teachers and (e) dialogue with students. This qualitative data was collected and triangulated for accuracy.

Time-tabling the Study

During discussions on the research study with District Education Officers and Head Teachers, appropriate guidelines were developed. Both Education Officers and Head Teachers suggested that since the study required a long period of time and related to the school syllabus materials, it should be scheduled within the school timetable. In that way, teachers and pupils would treat the program with serious commitment, considering it part of the regular curricular activities of the schools. Hence, teachers' and pupils' attendance would contribute to the success of the project.

In taking this suggestion into account, the researcher together with teachers, slotted the program into the regular school timetable. Since urban schools did not have agricultural periods teachers decided to use regular double periods of Fine-arts for the program while in rural areas teachers decided to use double periods of Agriculture for the program. Hence, each class had a 90 minute session twice a week.

Administration

There were various reasons to involve teachers directly in the study. The foremost reason was to determine whether use of instructionally designed modules would require teachers' instructional assistance or if administrative assistance alone would be sufficient.

The second reason was that by conducting seminars for the teachers and observers on their respective specific roles the program would run smoothly. Essentially, the researcher needed assistance in the smooth operation of the program.

After conducting seminars for teachers, observers and pupils in the first week of August 1989, the researcher expected the study would run smoothly without his daily presence in the schools.

He had initially thought his presence could influence the natural flow of teachers' and pupils' behavior in the project.

Management Problems:

Problems were detected during the second week of the study. First, although teachers had shown an interest in the program and were eager to see their pupils' perform successfully, they were rather reserved because they thought the program would take most of their time for doing their regular school work.

With such a preconceived perception, they had a problem with attending punctually and regularly to the program due to the regular work load they had in the schools. Although the researcher had clarified the teachers' role in the study during seminar discussions, the study appeared to the teachers to be quite demanding of their time and efforts.

Each teacher in the study had many other regular duties in the school. Thus, they perceived that attending to the study would create an additional demand on their time. Many of them were teaching an average of 5 to 7 periods a day in regular classes; they marked pupils daily exercises; they prepared lesson plans for the subjects they were teaching. In addition they prepared, supervised , and marked monthly tests for various subjects they were teaching in different classes.

Due to the above listed duties, the teachers sometimes did not attend the planning sessions for the study. In some cases, they came to the sessions late, and pupils would remain in classes, noisily waiting for the teachers to bring the study materials. Other teachers left the classes early to attend to other duties. Arriving late to classes was a common habit in other regular classes for some teachers.

When teachers arrived late, pupils in the class asked the class monitors to go and ask for the study materials. Such efforts indicated the potential assistance of the pupils themselves in facilitating smooth flow of the project.

Teachers in independent study groups in particular, provided the study materials for the pupils to study on their own and went back to their offices to work on other duties. In some cases, teachers remembered that it was the day and time for the study when they heard or saw the researcher's vehicle coming to the school.

The second problem involved a few pupils in each school. In each study group, a very few pupils started the project with very low interest. When the researcher asked teachers about the disinterested pupils the common answer was that they were always like that in other regular classes as well. One teacher commented, "some primary school pupils have no sense of purpose in their schooling; they come to school just because their parents want them to get a school education."

A third problem resulted when other school events interrupted the flow of the work on the study. For example, each school had monthly tests for all classes which took a week to supervise and mark, hence teaching and other activities stopped. Sometimes, inspectors visited the schools for a three day school inspection. All teachers were required to attend the inspection. Sometimes teachers attended obligatory school meetings.

Management Reorganization:

In light of the above problems, the researcher had to reorganize three aspects of the data collection during the third week. First, following discussions with the teachers in the study, arrangements were made to have two class monitors for the study in each class who were elected by the pupils to assist with administrative duties.

The monitors were given duties by teachers on such matters as: collecting the study materials from the offices; distributing them to their classmates; collecting and counting the study materials at the end of the session; monitoring the class and reporting to the teachers on pupils' attendance.

Secondly, the researcher decided to re-schedule the visits to the schools in order to observe every session. The researcher arrived at each school ten minutes earlier than the project time to discuss with participating teachers if there was anything that required attention. Sometimes the researcher and the teacher worked together in marking and compiling test scores. In that way, it was possible to begin and end classes on schedule.

Thirdly, the researcher reminded teachers they could do some of their work, such as marking, preparing lessons, and marking other subjects during sessions while students were working on their study materials.

Results from Management Changes

After one month, both pupils and teachers adjusted to the routine of the study, thus the flow of activities continued smoothly throughout the three remaining months as follows:

a. Independent Study Groups:

Teachers who supervised independent study groups provided administrative assistance only in such matters as preparing the classes for the sessions, providing the study materials to the class monitors for distribution to their classmates, and informing pupils to start or continue working on their modules.

The monitors distributed the study materials to the pupils along with other supplies such as pencils, erasers and atlases. At the end of each session class monitors collected all the materials and supplies from the pupils and returned them to the project teachers.

Teachers supervised the classes, marked tests and kept records of test results. They used the answer key provided by the designer to mark the three post-tests (see end of Appendix B). They also completed report forms on events for each session as instructed (Appendix E).

Teachers encouraged pupils to study the materials independently without seeking their assistance. When pupils started working on their study materials, and the teachers had provided the necessary support materials, they began doing their own work while continuing to monitor classroom discipline. Teachers were available when pupils asked questions pertaining to management and administration of the program.

During times when a teacher was called for other duties, or became sick, the class was able to continue working on the modules through the direction of the monitors and the researcher. When some pupils did not attend the school, the class monitors were informed about the reasons for their absence, sometimes even before the parents had reported to the school. In this way, it became possible to keep track of the absentees in the project.

Pupils' absences were due to such reasons as sickness, funerals and truancy. When absentees returned to school, they continued working on their modules from where they had stopped previously. In this way, pupils did not miss any part of the lesson. Each pupil continued working on the study materials at his/her own pace.

One teacher commented in the staff room that "if this approach was to be used in other subjects as well, the burden of teaching would be less in our primary schools". In a way, this particular teacher had a different outlook from her previous perception about the program. She felt the approach was capable of facilitating her teaching.

b. Instructional Assisted Groups:

Teachers who supervised instructionally assisted groups provided tutorial assistance to individual learners who needed help. Not all pupils asked questions. All worked on the study materials independently and some, mostly the low ability pupils, needed assistance.

Teachers assisted those who asked questions. In most cases pupils asked questions on map reading such as locating latitudes and longitudes in Module One. Teachers allowed pupils to ask any questions relating to the study materials. They answered pupils' questions individually in such areas as locating numbers in maps from Module Two and Three, and relating the maps from the modules with the school atlas maps, specifically in Module Three.

Teachers marked and graded post-tests and discussed difficulties and errors with those individual pupils who did not perform well on the test questions. They also asked pupils to review the materials in areas where they made mistakes in answering the questions. In addition teachers provided administrative services just as teachers who were supervising independent study groups.

c. General Results Due to Changes in all Four Schools:

On the basis of the arrangement described above, every session started and ended on time for the remaining three months of the study in all four schools. Collection and distribution of the study materials such as modules, atlases, and pencils was efficient due to pupils' help. In essence, time was not wasted on pre-sessional activities. Pupils spent more time working on the study materials.

After completing the first module, a change of behavior was noticed in teachers who initially had the preconceived perception that the project would require much of their time. The change of behavior was recognized in three ways.

First, the participating teachers pointed out that while pupils were working on their workbooks (modules), they had time to work on lesson preparation and marking for other subjects whereas in regular classes they would be teaching. The same teachers started commenting to other non-project teachers about the approach being a good time for marking school work and preparing lessons for other subjects.

Second, initially teachers had commented that the test questions for the project would be too difficult for some of the grade five pupils. When the results from the first module had indicated that all pupils, including those who seemed disinterested in school, had scored 50% and above and that the majority were above 70% they became more enthusiastic about the program.

Third, an echo from the pupils and teachers who were in the program and those who were not in the program (within the schools where the program was used) was noticed in various forms, especially in the beginning of the third week of September 1989 when the project pupils had started working on the second module. Project pupils were talking to non-project pupils about how and why they liked the approach; some non-project pupils requested to be included in the project.

Some non-project teachers requested copies of the materials for use in their classes. Other teachers requested the researcher provide them with copies for their own children who were studying in other schools, so they could use them during tutoring at their homes. Ultimately all four teachers in the study liked the program.

Since the number of the copies of the modules had been prepared according to the number of the pupils in the project, it was not possible to give them extra copies. After all pupils had finished working on a given module and had taken a post-test, they were allowed to take them to their homes. Some shared the materials with friends in other schools who had not been in the program.

At the end of the entire research study, the researcher requested teachers and observers to answer written questions in short essay form, describing their experience in the project and what they had observed during the sessions. The questions to the teachers and observers were the same, regardless of the treatment group involved (Appendix H).

Their descriptions were compiled, summarized and translated into the English language. Their descriptions are categorized according to the two types of instruction used in the project classes. Following are the summaries from the instructionally assisted groups and the independent study groups. The summarized responses of the two groups of teachers appear to be somewhat similar on certain points due to the influence of the "guiding questions" (Appendix H).

Teachers' Views of the Program

Independent Study Groups:

1. The modular approach used in Geography was liked by the pupils. The majority of pupils became confident in working successfully as they continued working on their workbooks.
2. If some text books were prepared as workbooks it would facilitate learning in our primary schools.
3. Pre-instructional guidance in the introductory parts of each module was clear and understandable for pupils to study the materials on their own.
4. Illustrations and figures were clear enough for the majority of pupils. However, it took some time for the low ability pupils to study some of the maps and figures on longitudes and latitudes.
5. Subject matter and practice items were clear and understandable for the majority of pupils, especially after they became familiar with the study materials.
6. Before pupils had started working on the study materials, non-project teachers were curious to see if grade five pupils could work successfully on the project. However, as the project continued they could see how pupils were motivated by their test results. It was from pupils' talk and test results that non-project teachers became more curious about the program.

7. This was the first time the schools had used modular workbooks in teaching.

8. The pre-instructional guidance in the introductory parts of the modules was comprehensive so that pupils were able to work on the materials on their own.

Instructionally Assisted Groups:

1. Pupils liked studying the instructionally designed materials very much.

2. It would be helpful to the primary schools if textbooks for pupils were written in modular form.

3. Not all pupils needed individualized instructional assistance. Some pupils required instructional assistance from the teachers and some of them studied on their own. Pre-instructional guidance given in the introductions was clear and sufficient enough to let the pupils study on their own.

4. Although maps and figures were legible and understandable for the majority of pupils, the low ability pupils needed instructional assistance, especially in locating the numbers and in the use of latitudes and longitudes. Maybe it would have been more helpful in clarifying the use of longitudes and latitudes, if globes had been available in addition to the atlases.

5. The subject matter and practice items were clear and followed the prescribed syllabus although the tests were too challenging for some pupils.

6. Before the project, teachers who were not involved in the project, were dubious as to whether the modules would work well for grade five pupils. They became positive about the modules as the project continued. They began requesting copies for use in their classes, and for children's tutoring at their homes. However, non-project teachers still thought that 90 minutes was too long for grade five pupils, studying on their own.

7. This was the first use of the modular materials in the primary schools. Although non-project teachers were suspicious of the time allocated to a session, project pupils appeared to enjoy working on their workbooks.

8. The introductory parts of each module were too long for primary five pupils. They should be shorter to provide more time for the pupils to work on the subject content.

Findings and Discussion of Qualitative Data

Research Question 5

> "What are some of the factors that would require consideration in introducing the instructionally designed modular approach in primary schools in Tanzania?"

The above research question was to explore some potential strengths and problem areas in introducing modular programs in Tanzanian primary education. Based on the literature review, this research question was drawn on the assumption that a modular program can be designed to work successfully in one particular context and fail to work in another context.

On the basis of observational data provided by the teachers and the researcher, there are some important conclusions one can make. The following are some of the findings drawn from this information:

1. Given that all other factors can be satisfactorily controled, the use of the modular approach would seem to work smoothly and efficiently during the school term and within the school timetable. Otherwise pupils' and teachers' commitment and concentration to the project would be problematic.
2. In using the modular approach with a class or with groups of learners, pupil leadership is potentially useful in management and administration. Pupils can elect monitors from among themselves to facilitate the smooth flow of the program.
3. Experience in a given project, along with the results that both teachers and pupils can get out of active involvement, would seem to be potentially powerful in influencing teachers' and pupils' perceptions of a program.
4. Planning, flexible management and administration during implementation stages are potentially crucial factors in introducing a new modular program into a primary school system.

The above data indicate that there are many potentially supporting factors but they also reveal problem areas that became evident during this study regarding the introduction of instructionally designed modules at the primary school level. Acceptance of modular programs requires interest, commitment, flexibility and patience among all participants. The participants in this case included the program developer, and the users of the program. However, interest, commitment, flexibility and patience are things that can be cultivated and developed in the process of introducing the modules.

Pupils made satisfactory progress in the subject. Teachers worked on other lesson preparation and marking while supervising the sessions. Among other factors, these two benefits helped in the success of the program. While some teachers expressed an interest in the program before it had started, it took some time for others to display such an attitude. This latter group gradually developed interest and commitment in the program as some benefits of the program began to become more evident to them.

Such apparent changes in attitude suggest that experiential familiarity to an innovation, accompanied by pupils' successful results and teachers' time convenience (benefits), create new perceptions of the innovation. In essence, realization that interactive instructional modules can facilitate learning is a potentially powerful factor for enabling an innovation to gain acceptance in a primary school. As teachers realized that the program was time-saving and was also effective for pupils' learning they began to develop more positive attitudes.

On the other hand, the finding that teachers in the present study liked the program differs from previous reports (Cientant, 1981; McKinley, 1981; Cummings, 1986). These reported studies showed that teachers who were supervising pupils on modular programs developed negative attitudes toward the programs as they did not prove to be effective.

However, for a positive change of perceptions to occur, there are other factors that also have to be considered. For example, planning, careful management and administration are basic factors necessary for any innovation to work smoothly and be successful.

These factors seem logical, but are difficult to carry out in the real practical world. Implementation of these factors requires administrative and management skills, creativity, and a high level of patient and dynamic involvement.

When the researcher was introducing the project in the schools, there were some problems that called for immediate administrative adjustments. Initially, the researcher had assumed that his carefully conceived research design would work smoothly in the field. The assumption was based on the structure of the procedures and the time schedule. In addition, all the project teachers and observers were given introductory seminars to explain program procedures, plus written procedural guides.

In situations where teachers have a heavy regular school work load, introduction of modular programs should be within the regular school timetable. Although modular materials may be effective for pupils' learning, some teachers would still want to know how it will affect their time. The program should be organized and administered in such a way that it becomes less time consuming for teachers. In this way teachers can accept the program with interest and commitment.

Use of pupils for classroom administrative duties helps, among other things, to lessen teachers' work load in such activities. Specifically, pupil help in classroom administration of the instructionally designed modules in this study had four advantages.

First, sessions started on time even if teachers arrived late.

Second, sessions continued smoothly when teachers attended other urgent duties such sickness or staff meetings which sometimes were organized during class time.

Third, monitors provided some incidental reports on various concerns related to the study, some of which represented useful information. For example, monitors reported that some pupils who were not in the study made requests to be included in the program. Hence, this indicator reflected that the program was gaining popularity and acceptance.

Fourth, the overall flow of the project ran very well. The researcher decreased his frequent presence during the sessions from the first week of October to the end of the study. He attended sessions once a week for every school. The researcher decreased his school visits because he wanted to see whether the project could continue without pressure resulting from his frequent presence during sessions.

The observers who worked as research assistants attended every session in order to collecting qualitative data. Since monitor assistance in administrative activities helped the smooth flow of this program, learners' willingness to participate in administration of the instructionally designed modules is another area to be considered.

Along with teachers' administrative considerations, pupils can play an important role in control of their own learning. The active involvement of pupils in administrative matters, as well as on their own instructional activities, can lessen teachers' work load. In addition the process creates a sense of responsibility, accountability and confidence among pupils about their own learning.

When pupils have some control of their own learning activities, they develop a greater sense of commitment and self esteem. Begin (1981) reported similar findings, in that learners who were using instructionally designed programs showed a behavior of self-esteem. In addition they assumed more responsibility for their learning activities; and teachers who were supervising such groups spent the time working on other activities such as marking and lesson preparation for other classes.

Flexibility in planning and administration in the use of modular programs for primary schools is another area that requires attention. Application of modular instructional programs sometimes requires continued adjustments under unforeseen circumstances based on local conditions in different schools.

This particular observation supports Havelock (1973) who observed that flexibility of schedule and procedures is an important factor in carrying out programs such as this one. Therefore, the program developer must make an effort to be realistic. Havelock contends that, the program developer will not think of everything. He then concludes that very often there are contingencies which arise which could not possibly have been foreseen. However, Havelock cautions that the program designer must make every attempt to prepare a schedule which is both flexible and schematic, a difficult balance to strike, but crucial.

On the basis of experience and suggestions made by District Education officers, head teachers and teachers, it appeared that use of the modular instructional programs would work smoothly during school time and within the school timetable. This was essentially confined by the present study, and is a very important issue especially when the program is new to the school.

On the other hand, if the program were introduced during non-school hours, it would likely face many obstacles. It would appear to teachers as an addition to regular teaching responsibilities. In addition, one would expect poor attendance, lack of support and eventual rejection of the program.

CHAPTER 7

CONSIDERATIONS, SUGGESTIONS, AND CONCLUSIONS

Considerations

The overall picture of the results of the study both in academic achievement and attitude scale shows the program was successful for grade five pupils in studying Geography. The researcher fully recognizes that it is inappropriate to generalize the findings of this study to other grade levels and subject areas. Nevertheless, it should be useful to consider the following factors when introducing modular programs for primary school pupils in Tanzania.

First, assuming that modular programs have been developed, how does one start introducing them in primary schools? How does one influence teachers who are skeptical about a new program? These are some of the basic questions for one to consider in starting modular programs in primary education in Tanzania.

Second, the present study used what one would call a chain of gradual administrative events, coupled with patience. The events included : (1) making contacts with key administrative people such as District Education Officers, and School Head Teachers; (2) building a good relationship with all teachers in the project schools; (3) familiarizing teachers in the project schools with the project; (4) identifying grade five classes, Geography teachers and observers for the project; (5) providing seminars and printed study guides to the project teachers and observers; (6) pre-testing project pupils; (7)

providing seminars for the project pupils; (8) starting the project by providing the modular materials to the pupils and teachers; (9) monitoring the flow of the process by identifying problem areas and potential elements for the smooth running of the project; (10) working on the identified problems and taking advantage of potentially strong elements by introducing them into the work flow of the project; (11) monitoring and maintaining the work flow; and (12) reducing the frequency of the presence of the project manager (researcher) to see if the work flow would continue smoothly on its own.

However, although the above steps may seem obvious and they did work successfully in the present project, they may not work in the same way in other situations and in all primary schools. It is important for researchers or developers who intend to start such projects to understand the circumstances of the school and work accordingly and patiently.

Sometimes problems may arise as a result of teachers' premature misconceptions of the program. It becomes very difficult to begin a program in situations where teachers have a passive resistance to something that appears an additional burden. It is important that teachers are 'captured and motivated.' Winning the support of teachers requires management and administrative skills, patience, flexibility and understanding.

Teachers' acceptance of a new program may vary with time and perceived results. While some teachers may be receptive before the project starts, others may not be ready at this stage. It takes time to see the benefits of a program for skeptical teachers to be committed to an innovation. Havelock (1973) has stressed that during the period of installation, an individual who will be involved in a change program must be allowed to become familiar with the innovation. He/she must learn how to use it and thus accept it as part of his/her routine behavior.

A third area of consideration relates to the environment of the school as a determining factor for pupils' effective learning through a modular approach. The findings of the present study showed a unique difference in test results in that urban primary school students scored significantly higher than the rural school students.

However, it should be noted that the mean for all pupils from both rural and urban schools (75.4%) was above the set standards pass mark of 50% for primary schools in Tanzania. In addition to the overall academic achievement, 87% of all pupils liked the program and 95% reported good progress in the program.

The rural primary school pupils in Tanzania tend to depend on an aural mode of learning. It is likely that with such an environment pupils are inclined to develop better aural skills than reading comprehension skills. Hence, in a program that would demand a high dependence on reading comprehension skills, rural pupils would benefit less. More studies are needed to explore ways of using the modular approach for as great a benefit in rural areas as in urban schools.

A fourth area of consideration relates to the use of instructionally designed modules in learning without additional instructional assistance from the teachers. The null hypothesis predicted there would be no significant difference in scores between the group that studied the modules under teachers' instructional assistance and the group that studied the same program independently.

Results from the study provided support for this null hypothesis. However, with such results some teachers may be tempted to use modules for all pupils without any individualized instructional assistance. It was seen that teachers' individual instructional assistance had some impact on student achievement as indicated in the test results. Although the impact was statistically insignificant, it should not be ignored.

Finally, on the basis of the experiences of the present researcher, development and evaluation of the prototype materials is intensive and time demanding. For example, the major phases included planning, designing, trying out, and finally utilizing the program in a research study. Such projects obviously require a great deal of patience and careful planning on the part of the designer. Therefore team-work in such projects is strongly recommended.

Suggestions for Future Research

1. The modular approach should be investigated with various subjects at different levels throughout the Tanzanian educational system. The results of the study suggest that the Ministry of Education should take leadership in conducting more in-depth studies in various disciplines and grade levels.

2. Studies should explore further explicit ways of adapting modular instruction to rural schools in Tanzania. Future studies should explore various ways of adapting the programs to rural primary schools so pupils in those schools can benefit from the approach as

much as urban pupils. It is possible that a rich and intellectually stimulating urban environment develops both reading comprehension and aural skills. Hence, in a program that would require only reading comprehension skills such students would benefit more than the students who have less reading comprehension capability.

3. Investigations should also explore further the question of teachers' instructional assistance. The null hypothesis predicted there would be no significant difference in scores between the group that studied the modules under teachers' instructional assistance and the group that studied the same program independently. Common sense would dictate that teachers should give consideration to pupils who require teachers' instructional support. Further in-depth studies involving various subjects are needed in this area as well.

4. Although the design and development of the instructional product for the present study was targeted specifically for the culture of the Tanzanian primary school, the technology of interactive modular instruction should not be considered to be a neutral technology according to some contemporary literature (Bowers, 1988). Bowers argues that language and machines are not neutral technologies. On the other hand, the position that consistent evidence from research indicates that no learning benefits are to be gained from employing any specific technology to deliver instruction (Clark, 1983; Clark & Salomon, 1986; Clark & Sugrue, 1988) could be viewed as supporting a view of neutral technologies. Each of these viewpoints should be examined carefully in future studies to determine whether interactive modular instruction is or is not a non-neutral intervention and whether or not the choice of delivery technology really influences the instructional outcome.

Conclusions

In summary, this study supports the following conclusions:

1. Grade five students in Tanzania learned Geography from interactive modular instruction.

2. Urban students performed significantly better than rural students (Hypothesis 1).

3. There was no significant difference between those groups of students who worked totally independently, as compared to those groups of students who received teacher assistance (Hypothesis 2).

4. There was no interaction between environment (rural vs urban) and method of using instructional materials (Hypothesis 3).

5. All students liked the modular instruction approach (Hypothesis 4).

6. Qualitative data explored utilization factors for interactive modular instruction.

The study supports the continued exploration and use of modular instructional methodologies as an integral part of quality education in the schools of Tanzania.

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APPENDIX A.

Correspondence Letters

University of Alberta
Edmonton
Canada T6G 2G5

Department of Secondary Education
Faculty of Education
338 Education South, Telephone (403) 492-3674
Fax: (403) 492-7219 Email: SE04@UALTAMTS

June 1, 1989

The Director
Postgraduate Studies
University of Dar es Salaam
P.O. Box 35091
Dar es Salaam, Tanzania

Re: Research Activities in Tanzania - Mr. Satoki T. Mahenge

Dear Sir:

Mr. Satoki T. Mahenge, who has been doing study leading to the Ph.D. degree in the Faculty of Education at the University of Alberta will be arriving in Dar es Salaam in early June. His plan is to complete research and development activities which he has planned, and which he hopes will enable him to collect sufficient data to complete the requirements for the degree upon his return to Alberta.

Mr. Mahenge will be in Tanzania from June through October, 1989. The majority of his developmental and research activity will require contact with the Ministry of Education and working with teachers and students in the elementary school system.

Thank you for your cooperation.

Sincerely,

Dr. J. J. La Follette, Associate Professor
Chairman, Advisory Committee for S. T. Mahenge

UNIVERSITY OF DAR ES SALAAM

P.O. Box XXXX - DAR ES SALAAM - TANZANIA

35048

Telephone No : 49192

Telegrams: UNIVERSITY
DAR ES SALAAM

Our Ref:

Your Ref:

June, 1989

The Vice Chancellor,
University of Dar es Salaam,
PO. Box 35091
DAR ES SALAAM

U.f.s. The Head,
Department of Education,
University of Dar es Salaam.

" The Dean,
Faculty of Arts and Social Science,
University of Dar es Salaam.

Re: **RESEARCH CLEARANCE:**

I am a member of academic staff in the Department of Education. I have recently returned from my studies at the University of Alberta in Canada. My return to Tanzania is to do research on "Programmed Instruction" (Modular Interactive Instruction) in primary schools in Dar es Salaam -effective June through November, 1989. The study is part of the requirements for my doctoral studies in the University of Alberta. The purpose of this letter is a request for a research clearance from your office to facilitate my study.

Yours sincerely,

S.T.Mahenge

Satoki T. Mahenge.

THE UNIVERSITY OF DAR ES SALAAM

Ref: No. [illegible]..............................
Date: [illegible]..............................
Ndugu: [illegible]..............................
[illegible]..............................
....
....

UNIVERSITY STAFF AND STUDENTS RESEARCH CLEARANCE

The purpose of this letter is to introduce to you Prof./Dr./Mr./Mrs./Miss/Ms. ....[illegible].................... who is a/are bonafide academic member(s) of staff/Student(s) of the University of Dar es Salaam and who is/are at the moment in research. Our staff members and students undertake research activities every year during the vacations. In accordance with the Resolution of the then [illegible] at its meeting held on the 11th March, 1972 (Min.9/71/VI), University staff and students were granted general permission to carry out research. The University Administration was empowered by that resolution to give clearance at its discretion to its staff and students.

We request therefore to grant the above mentioned member(s) of our University community and held that may facilitate his/her/their research objectives. All the living and travel expenses for the research project have been provided for by the University, the only required is your permission for him/her/them to see and talk to the leaders and members of your institution in connection with his/her/their research.

The title of the research in question is: "Pro[illegible]..............................
[illegible]..............................
....
....

The period for which this permission has been granted is from [illegible].......... to [illegible]...... and will cover the following areas:..........
....
....

Should some of these areas be restricted, you are requested to kindly advice him/her/them as to which alternative areas could be visited. In case you may require further details/information, please contact us through the telephone No. 49192-8.

Yours sincerely,

VIC[illegible]

G.R.V. Mmari

[illegible] DAR ES SALAAM

[illegible]

HALMASHAURI YA JIJI LA DAR ES SALAAM

BARUA ZOTE ZITUMWE KWA MKURUGENZI WA JIJI

S.L.P. 9084
SIMU: 23551

OFISI YA JIJI
DAR ES SALAAM

KUMBUKUMBU E/11

[illegible] Juni, 1989

Afisaelimu wa Kanda,
Ilala, Temeke, Kinondoni,
Halmashauri ya Jiji,
DAR ES SALAAM.

YAH: NDUGU SATOKI T. MAHENGE - KUFANYA UTAFITI KATIKA SHULE ZA MSINGI.

Ofisi imepokea barua kutoka kwa Makamu Mkuu wa Chuo wa Chuo Kikuu cha Dar-es Salaam yenye Kumb. AB 3/3 (B) ya tarehe 6/6/1989 ambayo inatuomba tumruhusu Ndugu S.T. Mahenge afanye utafiti katika Shule zako za msingi. Utafiti huo utahusiana na suala la Programmed Instruction katika Shule za Msingi.

Tafadhali mruhusu afanye utafiti katika Shule za Wilaya yako ambazo mtaafikiana naye.

Ni mategemeo yetu kuwa utampa msaada utakaouhitaji.

Z.M. Mhita
k.n.y. AFISAELIMU WA JIJI
DAR ES SALAAM.

K.n.y. AFISAELIMU WA JIJI
DAR ES SALAAM

HALMASHAURI YA JIJI LA DAR ES SALAAM

S.L.P. 9583
SIMU: NA. 20691/2

OFISI YA JIJI
KANDA YA KINONDONI
DAR ES SALAAM

KUMB. NA. G/35/132

1[illegible]/6/1989

Walimu Wakuu
Shule za Msingi
Mbezi, Mtakuja na
Ubungo Kisiwani
Wilaya ya Kinondoni
Dar es Salaam.

YAH: NDUGU SATORIT MAHENGE KUFANYA UTAFITI

Husika na kichwa cha habari hapo juu.

Tumepata barua kutoka kwa Afisaelimu Jiji ya tarehe 9/6/89 yenye Kumb. E/11 inayomruhusu mtajwa hapo juu kufanya utafiti katika shule zenu.

Tafadhali mpokeeni na apewe kila msaada anachohitaji ili afanikishe shughuli yake.

K.n.y. AFISAELIMU WA WILAYA
KINONDONI

Nakala:- Ndugu S.T. Mahenge
Chuo Kikuu cha
Dar es Salaam

HALMASHAURI YA JIJI LA DAR ES SALAAM.

Ofisi ya Elimu,
Wilaya ya Ilala,
S.L.P. 15486,
DAR ES SALAAM.

[illegible] Juni, 1989

Walimu Wakuu,
Shule ya Msingi,
Buyuni, Gongo la Mboto A,
Forodhani na M/Mmoja.

Y.H. SATOKI MAHENGE KUFANYA UTAFITI KATIKA SHULE ZENU.

Mtajwa hapo juu ameruhusiwa na Afisaelimu Jiji kufanya utafiti katika shule zenu.

Utafiti huo utahusiana na suala la Programmed Instruction katika Shule za Msingi.

Tafadhali mruhusuni ili aweze kufanya utafiti huo na ushirikiano wenu naye utahitajika sana.

G. U. [illegible]
K.n.y. Afisaelimu wa Kanda,
Wilaya ya Ilala.

AFISAELIMU WA KANDA
KANDA YA ILALA
DAR ES SALAAM

Nakala kwa: Afisaelimu Jiji,
Halmashauri ya Jiji,
S.L.P. 9084,
DAR ES SALAAM.

gu/mm

APPENDIX B.

GEOGRAPHY MODULES -PACKAGE SPECIMEN

(Translated from Swahili Language)

PUPILS' STUDY GUIDE AND WORKBOOK:
GEOGRAPHY MODULES FOR PUPILS COMPLETING GRADE FIVE IN TANZANIAN PRIMARY SCHOOLS

THE WORLD: LATITUDES, LONGITUDES, GENERAL PHYSICAL FEATURES AND MAJOR CLIMATIC REGIONS

PREINSTRUCTIONAL INFORMATION

Introduction

Tanzania's Grade VI Geography program focuses on workers around the world. The program introduces you to the general understanding of: (a) the world map; (b) concepts and uses of latitudes and longitudes; (c) general physical features of the world; (d) the major climatic regions of the world; and (e) major human economic activities around the world.

The three modules you are going to study focus on three major topics namely: (a) concepts and uses of latitudes and longitudes; (b) the world map -general physical features of the world; and (c) the major climatic regions of the world.

The main aim of the above three topics is to enable you develop map reading skills by using latitudes and longitudes; to identify major physical features of the world and to relate these features to the climatic regions. Such understanding and map reading skills can later help you understand and be able to explain the various human economic activities in the world, and how people manage to solve some of the geographic problems in the economic development.

Some of the geographical aspects covered in these modules have in one way or another been influencing human life and their institutions around the world. For example, positions of the countries, climatic conditions, physical features, and so on, are very powerful factors in determining human life and all other living organisms and plants.

This program is designed from the syllabus used in Tanzania for Grade VI level. It draws its content from the textbook used for subject as prescribed in the syllabus. The main reason for selecting pupils who are completing Grade V is that first, you are just about to enter Grade VI hence the study materials will be useful for next grade;

second since you have not been taught the topics before in your regular classes we would like to see how the program helps you.

However, the modules are designed considering that you have already covered the Geography of Tanzania when you were in Grade IV and now in your Grade V you are almost completing the Geography of Africa.

Overall Objectives

To help you on the geography of the of the world in this program, emphasis has been first placed on understanding the concepts of latitudes and longitudes and how you can use these lines in locating places, calculating time and distances; secondly, on locating major physical features of the world such as land and water, mountains and low lands; and thirdly, on locating and describing the major climatic regions of the world, such as the hot climatic region, the temperate climatic region, and the cold climatic region. After successfully completing studying the three modules, you will be able to:

1. -describe and use latitudes and longitudes in locating various places in the world, calculating time and distance of any given places;

2. -state and locate major physical features of the world on the world map; and

3. discriminate between and locate the major climatic regions on the world map.

Procedures

Procedural approach in implementing this program will be in the following order:

1. Pretesting you as a basis for evaluating the program at the end.

2. You will be provided with three modules of which you will be studying each module at a time. It is expected that you will spent one month in studying each module depending on your rate of study.

3. At the end of each module, you will do a follow-up test covering material for the module. This test is a review test for the material you have studied so that you get prepared for the post-test. After doing the review test you will mark it your self by comparing with the correct answers following the questions.

If you want to learn effectively do not look for the answers first before answering the questions. Such honesty will help you in doing well in the post-test where you will not be given answers. All the post-tests will be administered, supervised and marked by teachers.

Important Instructions

1. Each module has specific objectives and instructions on what to do and the expectations. The modules are designed as workbooks in which the student is given text segments to read, followed by examples to read, and practice question to answer in given spaces within the questions. After answering the questions on the segment you have just read you are required to correct them by comparing your answers with the answers given in the modules following the questions.

2. The package of the program includes some materials with which to work, such as figures and plain outline maps of the world for identifying and locating some geographical aspects which you are asked to do for practice purposes and for testing your own understanding of the study material.

3. You are also required to have a school atlas from your subject teacher if you do not already have one for use with this package.

4. You are required to have a pencil, an eraser, and a sharpener. You are strongly advised to **use pencils** in writing all your work. Do not use ink or ball-pointed pens, for it will be difficult to make

corrections. If possible, all the practice work should be done within the modules.

5. You are required to attempt all the exercise and test questions in all three modules.

(SPECIMEN: Translated from Swahili Language)

MODULE 1

LATITUDES AND LONGITUDES

Specific Objectives

After successfully completing studying Module 1, you should be able to:

(a) define latitudes and longitudes in your own words
(b) identify and locate latitudes and longitudes on the world map
(c) use latitudes and longitudes in locating places or countries in the world map.
(d) use latitudes in calculating distances for different places on the world map.
(e) use longitudes in calculating time for different places on the world map.

Study Requirements

(i) You will be required to read each text segment, examples, practice questions using Figures 1, 2, and 3; and World Maps 1 to 5 for this module.

(ii) In order to benefit more effectively in learning, you will be required to do each exercise (practice questions) given in each section without looking at the given correct answers first. After writing the answer(s) for each text segment, you will correct your answer(s) using a tick (/) for correct answers, and an X for wrong answers; and then evaluate your self to see how much progress you are making. Correct answers are given after the question(s) for each text segment and they should be covered when answering the questions.

(iii) After doing your review test inform your subject teacher who will give you a post-test to do and Module 2 for studying.

STUDY MATERIAL:

Locating places using latitudes and longitudes

TEXT:

When we want to accurately locate a place on a map we use latitudes and longitudes. We usually start tracing the latitude and then longitude.

EXAMPLE 1:

In locating place "N" from Figure 3, trace latitude 30 degrees south of Equator and then trace to the interception point with longitude 60 degrees east of main line 0 degrees.

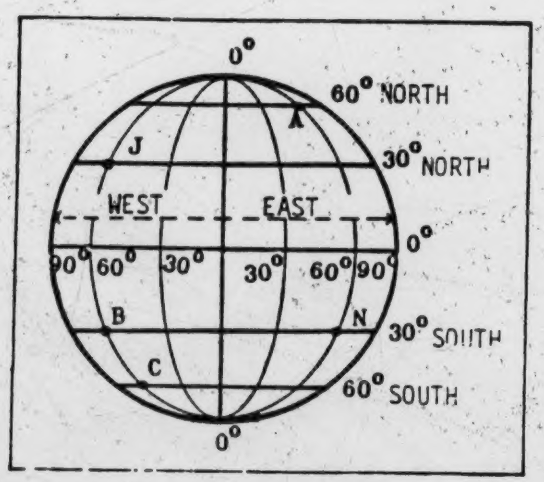


Figure 3. Locating places by using latitudes and longitudes.

EXERCISE:

By using Figure 3, locate the following places by writing degree numbers of latitudes and longitudes in the spaces provided after each place:

1. Place "J" is located on latitude ______degrees north and longitude ______west.

2. Place "A" is located on latitude ______degrees north and longitude _____ degrees east.

3. Place "C" is located on latitude ______degrees south and longitude ______ west.

4. Where is pace " located?
Write in your own words in the following space:

ANSWERS:

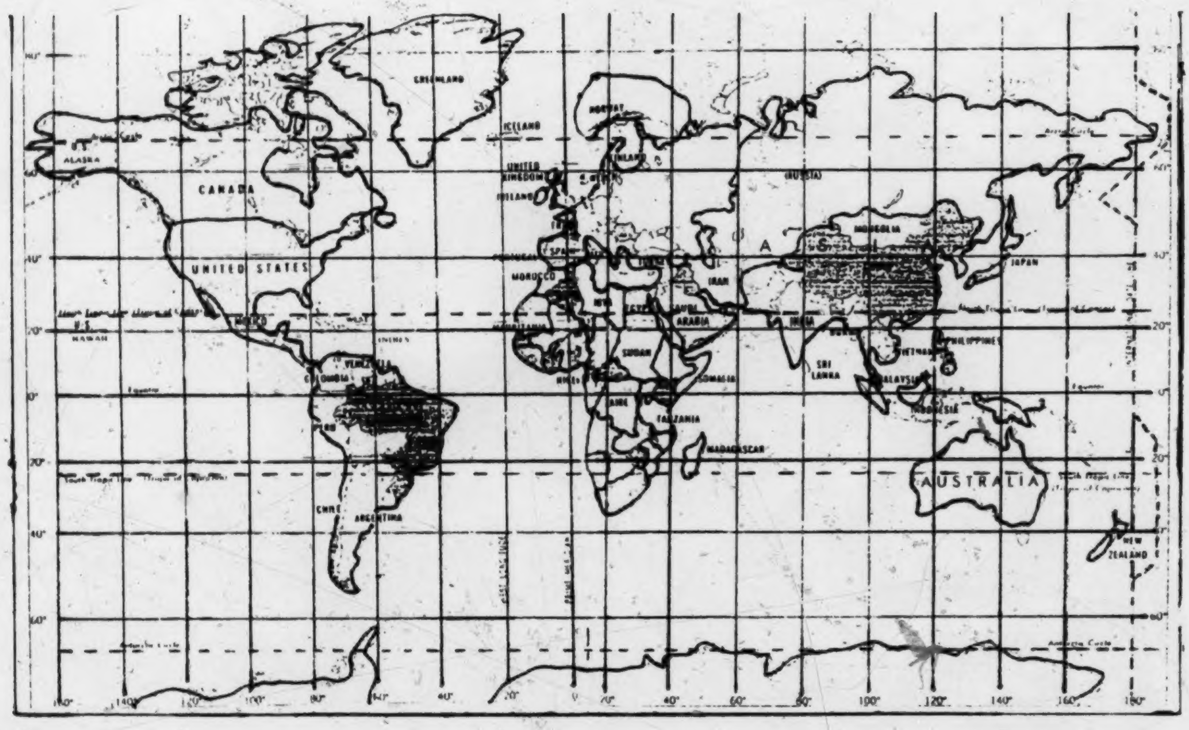
1. Place "J" is on latitude 30 degrees north of the Equator and longitude 60 degrees east of the Meridian Greenwich.

2. Place "A" is located on latitude 60 degrees north of the Equator and longitude 60 degrees east of the Meridian Greenwich.

3. Place "C" is on latitude 60 degrees south of the Equator and longitude 60 degrees west of the Meridian Greenwich.

EXAMPLE 2:

By using Map 3, and Map of Africa from your school atlas page 25 you will find that Tanzania is located between latitudes 1 and 12 degrees south of the Equator and between longitudes 29 and 40 degrees east of Meridian Greenwich.



Map 3. World Map Showing Latitudes and Longitudes

EXERCISE:

By using map of Africa from your school atlas page 25 locate the following towns using latitudes and longitudes:

1. Lindi town is near latitude ____ degrees south and longitude ___degrees east.

2. Accra city is near latitude ____ degrees north and on longitude ___ degrees.

3. Dar-es-Salaam city is near latitude ____ degrees south and longitude ____ east.

ANSWERS:

1. Lindi town is near latitude 10 degrees south of the Equator and longitude 40 degrees east of Meridian Greenwich.

2. Accra city is near latitude 5 degrees north of the Equator and on longitude 0 degrees (Meridian Greenwich).

3. Dar-es-Salaam is near latitude 6 degrees south of the Equator and longitude 39 degrees east of Meridian Greenwich.

REVISION TEST FOR MODULE 1

(Specimen)

Answer the following questions in the spaces provide after each question:

1. The distance from one latitude to the next latitude is________________km.

2.What is the total number of degrees of the circumference of a latitude ?

____

3. What would be the distance from the Equator latitude to latitude 10 degrees along the same longitude? ________________

4. Tanzania is located between latitude ______and _________ south of the Equator, and also between longitude _______and ___________east of Meridian of Greenwich.

Select the best answer to the following question and place the letter of the answer in the given brackets:

5. One of the advantages of having longitudes is:

(A) to calculate distances.
(B) to calculate time
(C) to calculate dates (. .)
(D) to calculate angles

==

ANSWERS FOR REVISION TEST

(Module 1)

1. The distance from one latitude to the next is 112 Km.

2. The circumference of a latitude is 360 degrees

3. The distance from the Equator latitude to latitude 10 degrees along the same longitude is (10 degrees x 112km.=) 1120 km.

4. Tanzania is located between latitude 1 and 12 degrees south of the Equator, and also between longitude 29 and 40 east of Meridian of Greenwich.

5. The best answer is (B) -calculating time.

(SPECIMEN: Translated from Swahili Language)

MODULE 2

THE WORLD:
MAJOR DIVISIONS AND GENERAL PHYSICAL FEATURES.

Objectives

After successfully studying and practicing the material for this module you will be able to:

1. -identify and locate major divisions of physical features on the world map;
2. -identify and locate the names of the continents on the world map; and
3. -name and locate the names of the major oceans, seas and lakes on the world map.

Study Requirements

(i) Use the outline World Maps 6 to 9(d) for learning and practice purposes in this module module.

(ii) You are also required to do all exercises (practice questions) for each text segments and you are also given correct answers for your corrections as you did in Module 1.

(iii) After completing the module you will do a revision test before attempting a post-test for module 2. Mark your revision test by comparing your answers with the answers given for the module.

(iv) After doing your revision test inform your subject teacher who will give you a post-test to do and Module 3 for studying.

STUDY MATERIAL:

Continents of the World

TEXT:

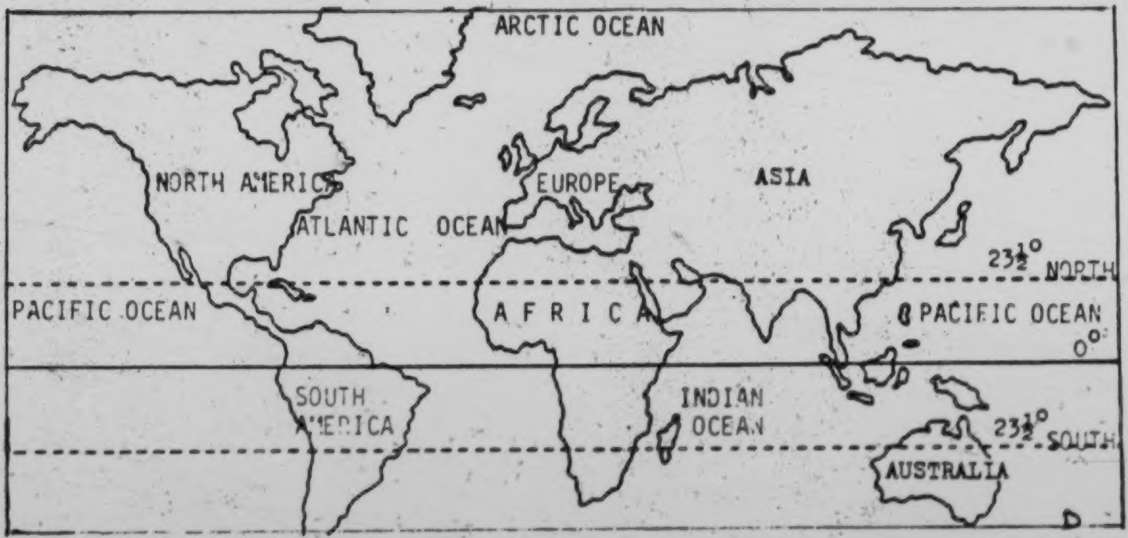
The world we live in is divided into continents. Continents are the largest masses of land which are not under water.

EXAMPLE:

The major continents include: Asia, Africa, Europe, North America, South America, Australia and Antarctica.

EXERCISE:

1. By using Map 6 which continent is the largest in the world?
2. Which continent is the second largest in the world?



Map 6. Map Showing Continents of the World.

ANSWERS:

1. Asia is the largest continent in the world.
2. Africa is the second largest continent in the world.

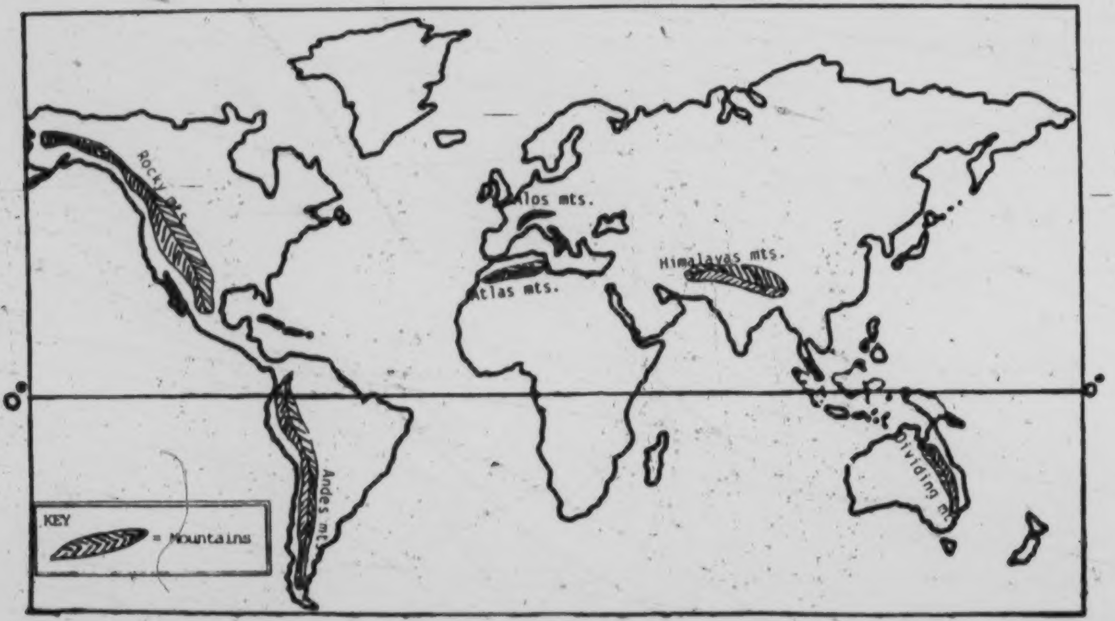
World Major Physical Features

TEXT:

The world we live in is basically composed of land mass and water. The land has mountains, high plateau and lowland.

EXAMPLE 1

By using Map 7 you will find the most famous mountain ranges in the world such as: the Himalayas, Alps, Rockies, Andes.



Map 7. World Map Showing Major Mountain Ranges

EXERCISE:

Using maps 6 and 7, answer the following questions by writing the names of the continents (in the spaces given after each question) in which you can find the following mountain ranges:

1. Himalayas mountain ranges are in the continent called ___________

2. Rocky mountain ranges are in the continent called

----

3. The Atlas mountain ranges are in the continent called ___________

4. The Alps mountain ranges are in the continent called

----

5. The Andes mountain ranges are in the continent called

ANSWERS:

1. The Himalayas ranges are in Asia.
2. The Rocky ranges are in North America
3. The Atlas ranges are in Africa
4. The Alps ranges are in Europe
5. The Andes ranges are in South America.

REVISION TEST FOR MODULE 2

(Specimen)

Answer the following questions in the spaces given after each question.

1. Complete the following statements to define the concepts of the words underlined:

a) an island is

----

b) a gulf is ___________________________________

----

c) a delta is ___________________________________

----

2. Which two major oceans surround both North and South America?

i). --

ii). --

3. Which is the largest continent in the world?

----

4. Which is the highest mountain in the world?

----

5. In which continent can you find the rocky mountains?

ANSWERS FOR REVISION TEST

(Module 2)

1. (a) An island is a small land surrounded by water on all sides.

   (b) A gulf is a part of an ocean water protruding to the land.

(c) A delta is formed when a river enters an ocean, or lake or sea by many tributaries forming alluvial soil deposits.

2. Two major oceans surround both North and South America are:
    i). Atlantic ocean and
    ii). Pacific ocean

3. Asia is the largest continent in the world

4. The Everest is the highest mountain in the world

5. The rocky mountains are in North America

(SPECIMEN: Translated from Swahili Language)

MODULE 3

MAJOR CLIMATIC REGIONS AND THEIR CAUSES

Objectives

After successful completion of studying this module you will be able to:

1. -identify and locate the three major climatic regions on a world map;
2. -identify and locate the sub-climatic regions within the hot climatic region on the world map;
3. -explain the main general characteristics of each climatic region which you have learned in this module; and
4. -name general factors which cause differences in climates of the world.

Study Requirements

(i) Use Figures 4 and 5, and Maps 10 to 12(b) in studying and practicing the material for this module. Attempt all the practice questions for each text segment and the revision test and mark them as you did in Modules 1 and 2.

(ii) After completing your revision test, your teacher will give you a post test. However, since this is your last module, you will be given a program evaluation form in which you will do according to instructions given in the form to evaluate the entire program.

STUDY MATERIAL:

Three Major Climatic Regions

TEXT:

We may divide the world into three major climatic regions. These climatic regions are found in both the northern and southern hemisphere as illustrated in the following Figure A and Map 10.

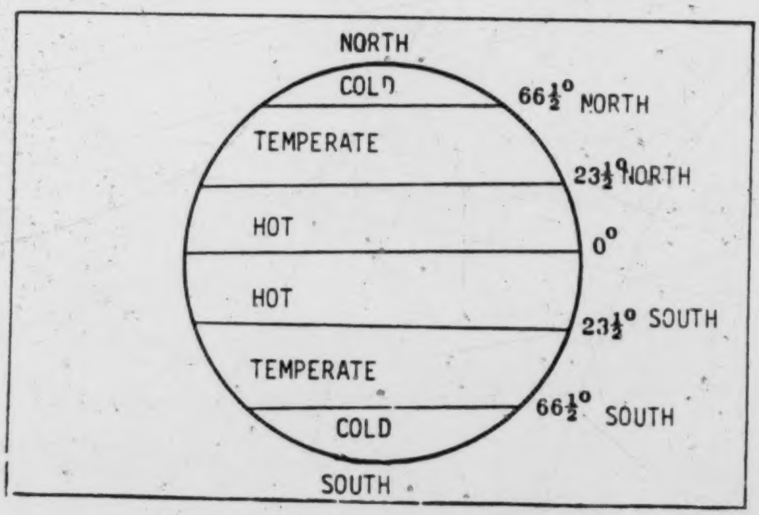
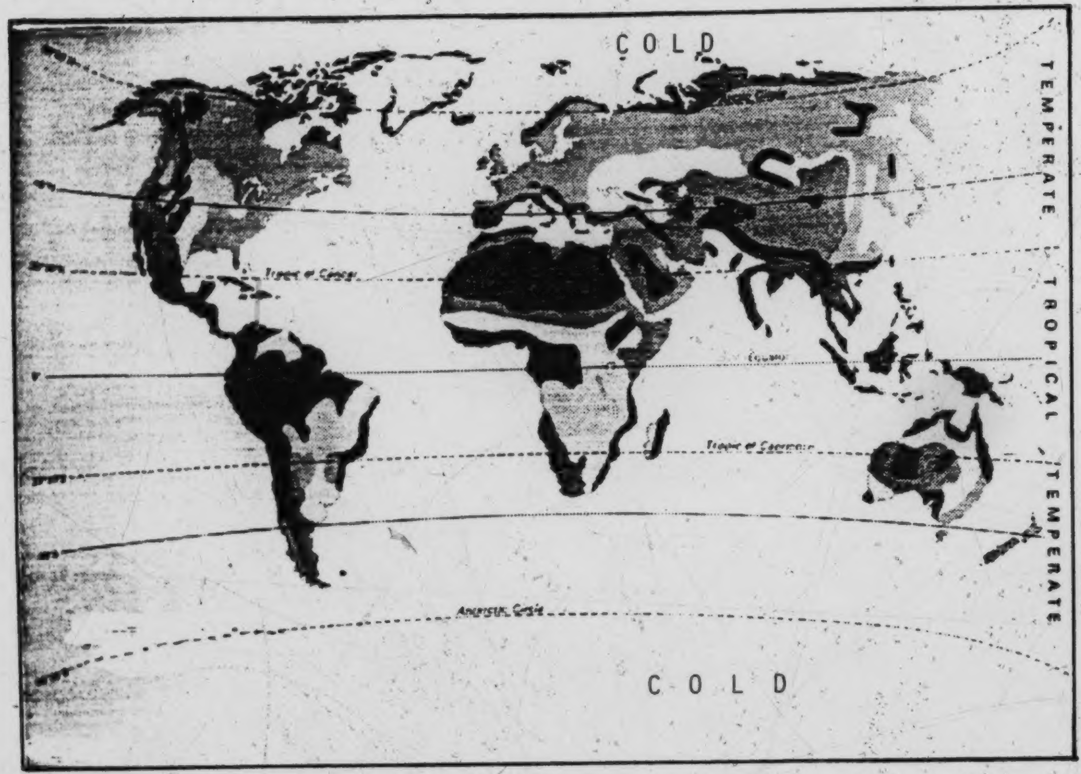


Figure A. Three Major Climatic Regions in The World

EXAMPLE:

i. the hot climatic region.
ii. the temperate climatic region and

iii. the cold climatic region.



Map 10. World Map Showing the Three Major Climatic Regions.

EXERCISE:

By using Figure A locate the three major climatic regions using latitudes by writing in degrees in the spaces given in each question:

1. The **hot climatic region** is between latitudes _____ and _____ degrees north of the Equator and latitudes _____ and ______ degrees south of the Equator.

2. The **temperate climatic region** is between latitudes _____ and _____ degrees north of the Equator and latitudes _____ and _______and degrees south of the Equator.

3. The **cold climatic region** is between latitudes _____ and _____ degrees north of the Equator and latitudes _____ and ______and degrees south of the Equator.

ANSWERS:

1. The **hot climatic region** is between latitudes 0 and 23 1/2 degrees north of the Equator and latitudes 0 and 23 1/2 degrees south of the Equator.

2. The **temperate climatic region** is between latitudes 23 1/2 and 66 1/2 degrees north of the Equator and latitudes 23 1/2 and 66 1/2 and degrees south of the Equator.

3. The **cold climatic region** is between latitudes 66 1/2 and 90 degrees north of the Equator and latitudes 66 1/2 and 90 degrees south of the Equator.

REVISION TEST FOR MODULE 3
(Specimen)

Answer the following questions in the spaces given after each question:

1. What are the three major climates of the world ?

i) ________________________________

ii) ________________________________

iii) ________________________________

2. Name two dates when the sun passes over the Equator latitude

i) ________________

ii) ________________

3. What do you think would be the climate in Europe when the sun is the southern hemisphere?

----

4. The hot climate is mostly found between which latitudes latitudes

5. The cold climate is mostly found between which latitudes latitudes

ANSWERS FOR REVISION TEST
(Module 2)

1. The three major climates of the world are:
   - i) Hot climate
   - ii) Temperate climate
   - iii) Cold climate

2. The sun passes over the equator on:
    i) September 21 and
    ii) March 21

3. When the sun is the southern hemisphere Europe gets winter climate.

4. The hot climate is mostly found between the Equator and 23 1/2 degree latitudes - both in the northern and southern hemisphere.

5. The cold climate is mostly found between latitudes 66 1/2 and 90 degrees -both in the northern and southern hemisphere.

EXAMINATION QUESTIONS (POST-TEST)

FOR MODULES 1. 2. & 3

(SPECIMEN:Translated from Swahili Language)

GEOGRAPHY EXAMINATION: MODULE 1

Name of the School

Pupil's Number ______________

Instructions:

a. There are 15 questions.
b. Time: 30 minutes
c. Answer all the questions

Choose the best answer in each question and fill a letter of the answer you have selected in the bracket given for each question.

1. What are the latitudes?

A. Straight lines
B. Circles
C. Imaginary parallel lines from west to east (...)
D. Imaginary lines from north pole to south pole

2. Among the following lines, which one is a meridian line?

A. 50 degrees longitude west
B. 50 degrees latitude north
C. Tropic of cancer (...)
D. Arctic circle in the north

3. Which one among the following African cities does the Meridian of Greenwich pass through?

A. Dar-es-Salaam
B. Cairo
C. Lagos (...)
D. Accra

4. The major difference between latitudes and longitudes is:

A. Latitudes are red while longitudes are black
B. latitudes are parallel while longitudes converge
C. Latitudes are thick while longitudes are thin (...)
D. All latitudes are longer than longitudes

5. One of the uses of longitudes is:

A. For measuring weights
B. For measuring distance
C. For calculating dates of a given place (...)
D. For calculating time of a given place

6. One of the relationships between longitudes and latitudes is:

A. In measuring weather
B. In locating places
C. In indicating physical features of a place (...)
D. In indicating gravity forces of a place

7. Latitudes are also used in explaining and locating:

A. Mountain ranges
B. Center of gravity
C. Economic activities (...)
D. Climate changes

8. The Equator divides the earth into:

A. South and north hemispheres
B. West and east hemispheres
C. Small and big hemispheres (...)
D. Four directions of the earth

9. What is the time difference from 0 degree latitude to 15 degree latitude?

A. 15 minutes
B. 4 minutes
C. 1 hour (...)
D. 15 hours

10. Which one of the following formula is used in calculating degrees from one longitude to another?

A. 360/24
B. 24/360
C. 360/48 (...)
D. 360/52

11. The equator latitude is given:

A. 10 degrees
B. 23 1/2 degrees
C. 1 degree (...)
D. O degrees

12. Tanzania is between one of the following set of latitudes:

A. 5 and 10 degrees south of Equator
B. 1 and 12 degrees north of Equator
C. 1 and 12 degrees east of Greenwich longitude (...)
D. 1 and 12 degrees south of Equator

13. Tanzania is also between one of the following longitudes:

A. 20 and 60 degrees east of Meridian Greenwich
B. 29 and 51 degrees east of Meridian Greenwich
C. 29 and 40 degrees west of Meridian Greenwich (...)
D. 29 and 40 degrees east of Meridian Greenwich

14. Dar-es-Salaam is very close to the following longitude and latitude:

A. 39 degrees longitude east and 6 degrees latitude south
B. 39 degrees longitude west and 6 degrees latitude north
C. 29 degrees longitude east and 40 degrees latitude south (...)
D. 40 degrees longitude east and 10 degrees latitude north

15. The latitude 23 1/2 south of Equator is called:

A. Cancer
B. Capricorn
C. Greenwich (...)
D. Arctic

GEOGRAPHY EXAMINATION: MODULE 2.

Name of the School

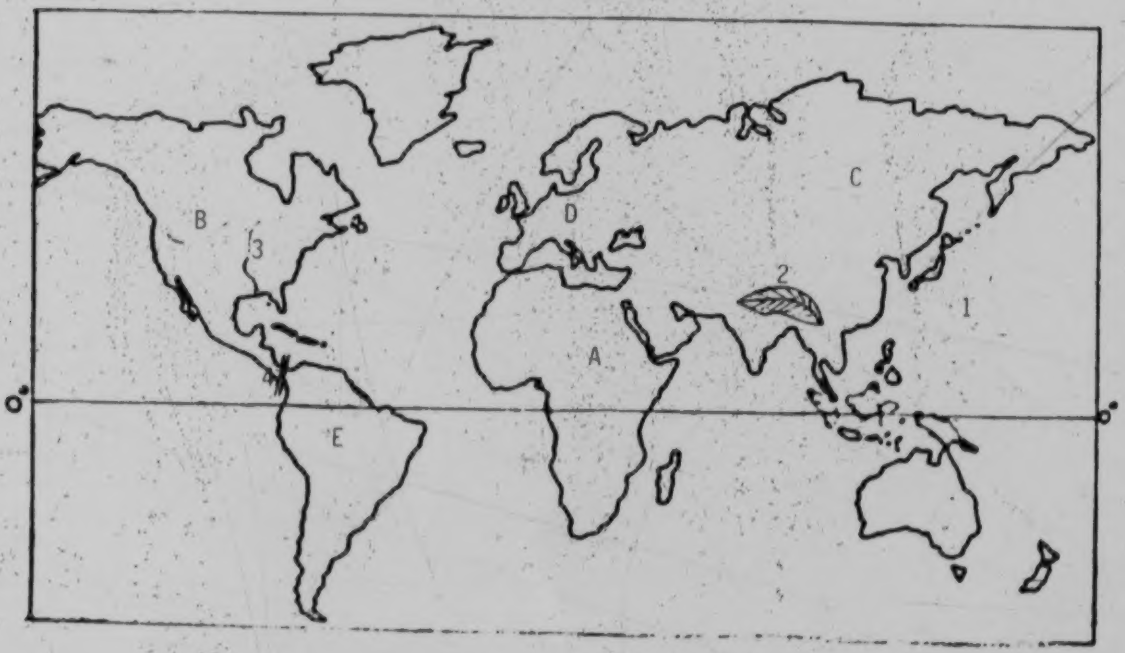
Pupil's Number ______________

Instructions:

a. There are 14 questions.
b. Time: 30 minutes
c. Answer all the questions

Use the following Map "A" in answering questions 16 - 24. Select one best answer for each question.

World Map "A"



16. The continent showed by letter "E" is called:

A. North America
B. Australia
C. South America (...)
D. Asia

17. The continent indicated by letter "C" is called

A. Europe
B. Africa
C. Asia (...)
D. Russia

18. What continent is indicated by letter "D"?

A. North America
B. Asia
C. Australia (...)
D. Europe

19. What continent is indicated by letter "A"?

A. South America
B. North America
C. Africa (...)
D. Asia

20. Name the continent showed by letter "B"

A. North America
B. South America
C. Australia (...)
D. Central America

21. What is the name of the ocean indicated by number 1?

A. Indian ocean
B. Atlantic ocean
C. Antarctic ocean (...)
D. Pacific ocean

22. What is the name of the mountain showed by number 2?

A. Rocky mountains
B. Alps
C. Andes (...)
D. Himalayan

23. What is the name of the river indicated by number 3?

A. Amazon
B. Mississippi
C. Ganges (...)
D. Niger

24. What is the name of the canal indicated by number 4?

A. Persia
B. Suez
C. Cape of Good Hope (...)
D. Panama

25. The highest mountain in the world is called Everest and is within the Himalayan ranges. This mountain is in:

A. Africa
B. Europe
C. Asia (...)
D. America

26. A gulf is:

A. a small portion of ocean projecting into land
B. a small portion of land projecting into ocean
C. distributors of a river entering the sea (...)
D. the highest point of a mountain

27. A delta is:

A. a small lake
B. a meandering river
C. river distributors when entering sea/ocean (...)
D. a flooded river

28. A peninsular is:

A. a portion of land surrounded by ocean water
B. desert area that has water and plants
C. a huge bridge across a huge river (...)
D. a narrow mainland stretching into sea/ocean

29. A cape is:

A. a portion of ocean/sea extending inland
B. a portion of the mainland extending into ocean
C. a river canal (...)
D. highest point of the mountain

GEOGRAPHY EXAMINATION: MODULE 3

Name of School

Pupil's Number ______________

Instructions:

a. There are 21 questions.
b. Time: 45 minutes
c. Answer all questions

Select one best answer and fill the letter of that answer in the given bracket.

30. The following are some of the things related to weather forecasting:

A. mountains, rivers, road conditions
B. temperature, wind directions, rain
C. air transport, water transport, wind (...)
D. temperature, soil erosion, rain

31. Higher areas of the Kalahari desert tend to have clouds most of the time. The reason for such weather is due to:

A. the dust from the Kalahari desert
B. the Benguella ocean currents
C. the rains from south-west coastal areas (...)
D. the Agluhas ocean currents

32. Why leeward areas of a mountain do not get enough rain?

A. they get dry winds
B. they do not get winds
C. they do not get enough light (...)
D. they are protected from rains.

33. Which one of the following is most related to the causes of the climate/weather?

A. economy, politics, education, industries
B. distance, altitude, winds, oceans
c. people, animals, storms, forests (...)
D. insects, plants, forests, deserts

34. The tropical climate is between:

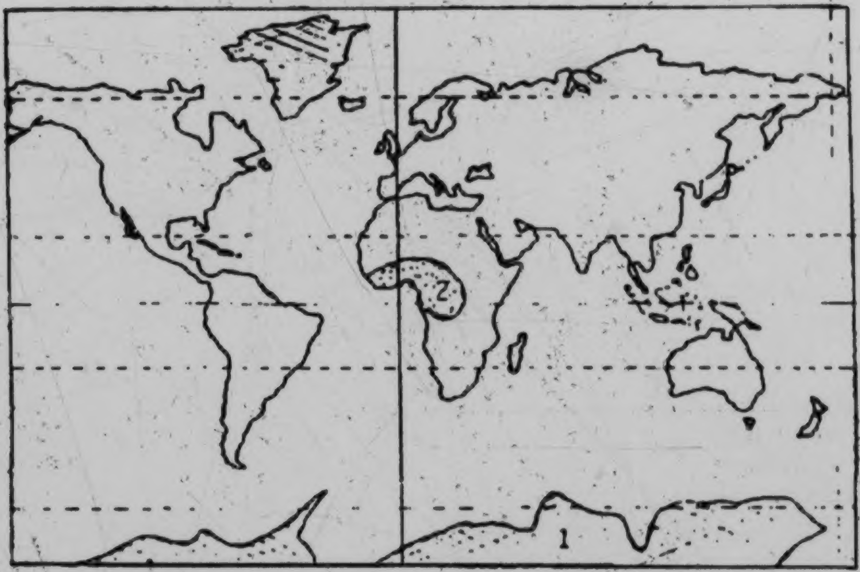
A. 0 - 23 1/2 degrees latitudes south and north of Equator
B. 23 1/2 - 66 1/2 degrees latitudes south and north of Equator
C. 0 - 23 1/2 degrees latitude south of Equator (...)
D. 0 - 23 1/2 degrees latitude north of the Equator

35. When does the sun pass over the Equator?

A. June 21st and December 23rd in every year
B. September 21st and March 21st in every year
C. June 21st and December 21st in every year (...)
D, February 5th every year

Use the following Map "B" in answering questions 36 and 37.

World Map "B"



36. What is the climate of the area indicated by number 1?

A. Equatorial climate
B. Tropical climate
C. Cool climate (...)
D. Cold climate

37. What is the climate in the area indicated by number 2?

A. Heavy climate all the year round
B. heavy rains half year and dry half year
C. very cold half year and hot summer half year (...)
D. Winter, ice and snow all year round

38. Which continent is largely under the tropical climate?

A. Europe
B. South America
C. Asia (...)
D. Africa

39. What would be the climate of the highlands along the Equator?

A. Hot rains all year round
B. Heavy rains from April to October
C. Cool, sometimes cold above altitude 2000m. (...)
D. Dry climate

40. Why do you think Europe has very cold winters from November to April every year?

A. season when the sun is in south of Equator
B. season when the sun is in north of Equator
C. season when the sun is along the Equator (...)
D. season when the sun is along the Cancer

41. Why do you think some coastal areas of the ocean such as Dar-es-Salaam have warm climate when the interior of the mainland has cool climate?

A. due to economic differences
B. due to warm ocean currents
C. due to coastal rains (...)
D. due to high heat from the sun

42. Which one of the following pairs shows warm currents?

A. Guinea and Kuro Siwo currents
B. California and Benguelar currents
C. Gulf and California currents (...)
D. Humbold and East Australian currents

43. Which side of the mountain slopes gets direct rays from the sun in the southern hemisphere beyond latitude of Capricorn?

A. South side
B. East side
C. West side (...)
D. North side

44. Why do you think the tropical and equatorial mountain ares are not very much affected by the position of the sun?

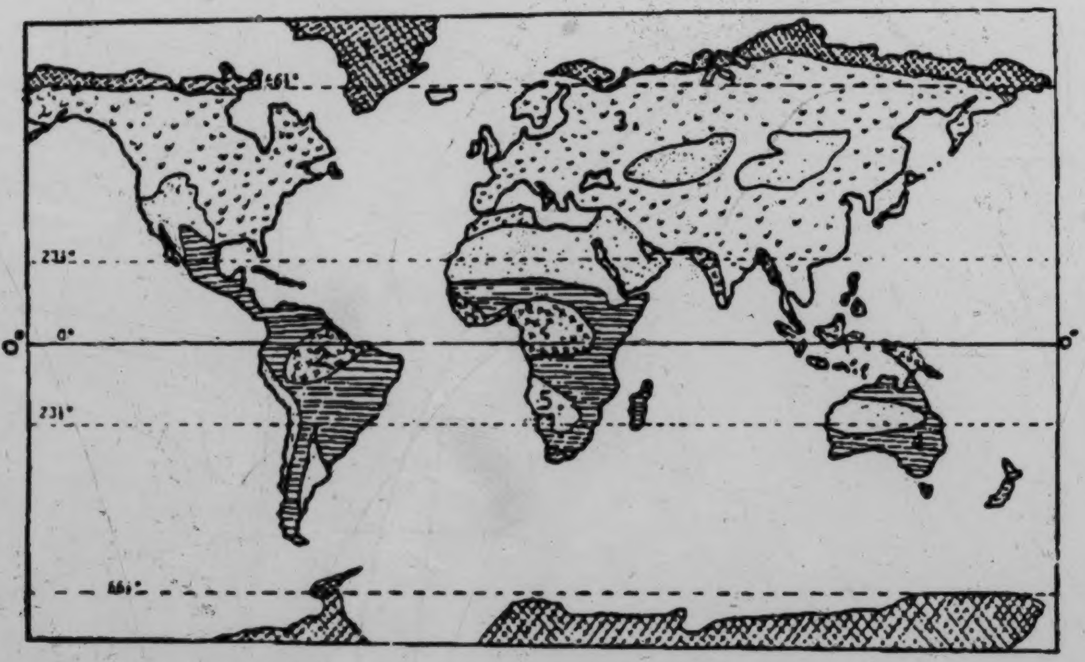
A. because they are strong mountains
B. because the sun passes vertically along these areas
C. because they are very high mountains (...)
D. because there are thick forests

45. For how long does the earth make its complete rotation on its axis?

A. 24 hours
B. 48 hours
C. 15 hours (...)
D. 52 hours

Use the following Map "C" in answering questions 46 to 50.

World Map "C".



46. The climate in the region indicated by number 1 is described as:

A. very hot climate
B. cool climate
C. warm climate (...)
D. very cold climate

47. How would you describe the climate in the region indicated by number 2?

A. hot climate all year
B. cool climate all year
C. cold climate half year (...)
D. Temperate climate all year

48. What is the general name of the climatic region number 3?

A. Tropical climate
B. Temperate climate
C. Cold climate (...)
D. Equatorial climate

49. The climatic region with number 4 is called:

A. Equatorial climate
B. Temperate climate
C. Tropical climate (...)
D. Desert climate

50. The climatic region with number 5 is called

A. Cold climate
B. Equatorial climate
C. Temperate climate (...)
D. Hot desert climate

POST-TEST ANSWERS -GEOGRAPHY:

MODULES 1, 2, AND 3

The following are the answers for the post-test questions. The numbers in brackets are the numbers of the questions. Upper-case letters are the correct answers to be selected for the questions.

ANSWERS FOR MODULE I QUESTIONS

(1) C; (2) A; (3) D; (4) B; (5) D; (6) B; (7) D; (8) A; (9) C; (10) A; (11) D; (12) D; (13) D;
(14) A; (15) B.

ANSWERS FOR MODULE 2 QUESTIONS

(16) C; (17) C; (18) D; (19) C; (20) A; (21) D; (22) D; (23) B; (24) D; (25) C; (26) A; (27) C; (28) D; (29) B.

ANSWERS FOR MODULE 3 QUESTIONS

(30) B; (31) B; (32) A; (33) B; (34) A; (35) B; (36) D; (37) A; (38) D; (39) C; (40) A; (41) B; (42) A; (43) D; (44) B; (45) A; (46) D; (47) A; (48) B; (49) C; (50) D.

APPENDIX C

(Translated from Swahili Language)

SEMINAR PRESENTATION FOR TEACHERS
(GUIDELINES)

Teachers should be informed about the nature and purpose of the project to be carried out in the schools. They should also be informed what is expected from them.

Aims of the Project

i. To find out how well grade five pupils can learn Geography lessons through modular interactive instruction.

ii. To explore some important factors for consideration in introducing modular Geography lessons in primary schools in Tanzania.

Expectations

There are many things which each teacher is requested to observe in supervising pupils in the project. The following topics are to be discussed during seminars with teachers in their respective groups.

Teachers in individualized instructional assisted groups

A. Instructional Assistance

1. Providing individualized tutorial assistance for individual learners who will need help:

   a. the teacher should provide individualized instructional assistance only to those who ask for help.

   b. the teacher should not provide instructional assistance to the entire class or a group of pupils except to individuals indicating a need for such help.

2. Marking tests and discussing with individual pupils who do not perform well in tests:

   a. the teacher should help pupils by guiding them to identify errors made in answering questions. However, he/she should not provide answers in any case unless the pupil fails more than three times.

   b. the teacher should ask pupils to study the materials again in areas they made mistakes in answering the questions.

   c. the teacher should let the pupils re-attempt answering questions they did not perform well in their first attempt.

3. Acting as a resource person for any Geography subject from the modules:

   a. the teacher should be a resource person to the individual pupil asking questions for more knowledge pertaining to the Geography topics in the modules.

4. Instructional monitoring to see if each pupil is working on the study materials:

    a. monitoring the class should be done throughout the session without interrupting the flow of study concentration.

    b. pupils can ask any questions provided they relate to the study materials.

    5. Pupils are free to ask teachers anything relating to the program:

    a. any question asked by an individual pupil should be attended with respect to the pupil who has asked it.

B. Administrative Duties

1. Classroom management:

    a. getting pupils into the class and in their proper sitting places.

    b. informing the pupils of any administrative norms for the study of the materials.

2. Distributing the study modules and support facilities:

    a. each pupil should be given his/her own module to start/continue working. Also they should be provided with support facilities such as pencils, erasers, atlases, and so on.

b. each pupil is given a permanent number for the project representing his/her name. The number is for the confidentiality of their performance results.

c. a pupil should be allowed to continue to the next module after scoring 70% or above in a revision test.

d. at the end of each session the teacher should collect all modules and support facilities.

3. Supervising and marking tests:

a. teachers are also requested to supervise and mark tests using the marking scheme provided. Each pupil will take a test individually after completing the module.

b. teachers are also requested to keep records of pupils marks. After all pupils have finished taking a test of a given module, a teacher should compile the marks and display on the notice board by using pupils' numbers rather than their names.

4. Filling in report forms:

a. after each session, teachers will fill in report forms as instructed in the forms under the following headings:

i. observed events,
ii. pupils' behaviors,
iii. teachers activities,
iv. pupils' problems in studying the materials,
v. teachers' problems pertaining to supervision and instructional assistance,
vi. any other information.

5. Use of Teachers' Guide:

a. a written guide for teachers is provided to help and remind teachers of instructional assistance and supervisory duties. Teachers are requested to refer to the guide frequently, in case some information given in the seminar is forgotten. The seminar topics are taken from the teachers' guide.

b. since the Project Organizer will be around during sessions, the Organizer will be available to assist teachers in case any problem arises.

Teachers in non-Instructional Assisted Groups.

A. Things to do

1. Classroom management:

a. teachers are expected to get pupils into their classes and in their sitting places ready for the project.

b. teachers are expected to inform pupils to start/continue working on their modules.

2. Distributing the study materials:

a. teachers are requested to distribute the modules to the pupils according to their numbers; and the support facilities such as pencils, erasers, atlases and so on.

b. each pupil has been given a permanent number for the project to represent his/her name for privacy of performance results.

c. at the end of each session teachers should collect back all the modules and support facilities from the pupils.

3. Supervising and marking tests:

a. a teacher is also requested to supervise, mark tests and keep records of tests results. A marking scheme will be provided by the Project Organizer.

4. Filling in report forms:

Teachers are provided with report forms in order to fill in events for each session as instructed in the forms under the following headings:

a. observed events for each session,
b. pupils' behavior relating to the program,
c. pupils problems emanating from the program,
d. teachers' problems pertaining to the supervision of the groups,
e. any other useful information relating to the program.

B. Things Not to do

1. Teachers should not provide any instructional assistance:

a. teachers are requested not to provide any kind of individualized or group tutorials.

b. pupils will also be informed of what things to ask for i.e. administerial services and facilities.

2. Teachers are requested not to discuss test performance leading to instructional learning the subject:

a. correction of errors made in the tests should be done by individual pupils through re-reading the modules. Pupils will be informed of this technique.

3. Teachers should refrain from acting as resource persons:

    a. pupils will be encouraged to study the materials independently without seeking knowledge from the teachers.

4. When pupils have started working on their study materials, and the teacher has provided the necessary support materials, there is no need for continued monitoring of the program.

5. Pupils are not free to ask any question that requires academic information relating to the topics in the modules, unless they are administrative questions.

APPENDIX D.

(Translated from Swahili Language)

FORMATIVE EVALUATION ON THE MODULES

PHASE ONE

1. Add another clear latitude to locate the city of Dar-es-Salaam on Map 4 (by teachers and District Education Officer)

2. Indicate the specific location of the city of Accra and the town of Lindi in Map 4 (by District Education Officer)

3. Simplify some of the maps i.e. Map 4, to indicate clear boundaries and the related information (by District Education Officer and teachers)

4. Unit 2 deals with location of the continents and their main features. Since the division of water and land is one of the main features discussed, then a way should be made to differentiate between the two features by color in order for young learners to have a clear conceptualization (by teachers and District Education Officer)

5. Some more pictures may be needed to enrich the concept of climatic vegetation in Module 3, to facilitate more understanding (by District Education Officer)

6. The Teacher's guide needs to be translated into the Swahili language as well (by teachers)

7. Use simple Swahili words in technical language such as tools used in measuring weather --i.e. rain gauge, thermometer, anemometer, hygrometer, etc. (by pupils, teachers, and District Education Officer)

8. The duration prescribed (one month) to study all three modules is so short that it affected pupils' participation in other important school activities. Suggested duration:
   a). three months @ 2 hrs. a week (20%);
   b). four months @ 1 hr. a week (33%);
   c). five months @ 1 hr. a week (20%) (by pupils and teachers)

9. All test questions need to follow the format that pupils are accustomed to using. Hence consider designing them into multiple choice questions -- a national standard format for primary schools (by teachers and District Education Officer)

10. Time to guide pupils and teachers on how to go about implementing the program was not adequate; thus, some pupils got lost at the beginning (by teachers and pupils)

11. Use and refer pupils to Atlasi Mpya kwa Shule za Msingi za Tanzania; by George Philip, 1985 --for pupils to associate what is in the modules with what is in their own atlases (by teachers, Head Teachers and District Education Officer)

12. Most pupils can effectively study the modules at school. It will be difficult for them to study at home because the majority will not concentrate due to other duties at home (by District Education Officers, Head Teachers and teachers)

PHASE TWO

1. The Pupils' Attitudinal Questionnaire needs to be in multiple choice format as well, because not all grade five pupils can write long statements that can well express their views (by teachers)

2. Corrections are needed for typing errors on pages 6, and 11 of the second module (by teachers and pupils)

3. Consider extending the duration for studying the three modules for three months so that the study sessions can be scheduled within the school work hours. Daily sessions extending beyond school hours appeared undesirable for some teachers, pupils and their parents (by teachers and pupils)

4. Pupils liked the program very much and they require other subjects to be presented in a similar design. However, they requested independent study sessions to be used for studying the modules (by teachers and pupils)

5. Some non-project teachers requested some copies so that they can use them in their classes as well (by teachers)

6. The study materials can also be used as review work for grade seven pupils (by teachers).

APPENDIX E.

TEACHER'S LOGBOOK AND GUIDE

In the attached monthly observation forms, you have been given various things to observe during sessions. The following are guidelines for filling in the forms:

1. **Observed Events**

Under this heading you are requested to fill in things such as:

(a) Activities which have taken place during each session: i.e. pupils activities.

(b) Pupils' activities may include studying the materials, doing tests if they have been given a test, doing exams and so on.

(c) Any other activities which may arise during sessions.

2. **Pupils' Behavior**

(a) Were the pupils studying the materials seriously or lightly?

(b) Did the pupils ask questions relating to the study materials? If yes, list in brief summary the type of questions asked in the spaces given in the form.

(c) Did the pupils indicate an interest or dislike in studying the materials?

(d) Were some pupils sleepy while studying the materials?

(e) Were the pupils fast or slow in studying the materials or in doing exams?

3. **Teachers' Activities**

Teachers' activities may depend on the type of group of pupils. In general, teachers' activities may include administrative activities i.e. provision of study materials and other related facilities, supervising and marking tests/exams, or recording events of the session in the forms, etc.

4. **Pupils' Problems**

It is difficult to list pupils' problems at this stage. However, teachers' may record any pupils' problems which may arise during sessions. In general teachers should note pupil difficulty in studying the materials or writing exams, classroom conditions (such as lack of desks) which might interfere with the program, pupil absences, and so on.

5. **Teachers' Problems**

Also it may be difficult to specify teachers' problems, as this would depend on what one encounters and perceives as a problem. However, teachers may identify what they perceive as problems to them in handling classes related to the study materials i.e. absence of some pupils, administrative matters, instructional matters, and so on.

6. **Any Other Related Useful Information**

Some information may arise from the events of teachers supervising classes and pupils studying the materials, which may be valuable but cannot fit in the above five headings. Hence, teachers can fill in such information under this section. Example would include general or specific comments and reporting from pupils, or from non-project teachers in the school, including the Head Teachers, and so on.

OBSERVATION FORM

SCHOOL.......R1, R2, U1, U2: (Circle your school code number)

MONTH________________/ WEEK... 1, 2, 3, 4 (circle number)

OBSERVER'S NAME

Please, fill in the information in this form as instructed in the guide.

OBSERVED EVENTS

PUPILS' BEHAVIOR

TEACHERS' ACTIVITIES

PUPILS' PROBLEMS

TEACHERS' PROBLEMS IN SUPERVISION etc.

ANY OTHER USEFUL INFORMATION

APPENDIX F.

(Translated from Swahili Language)

SEMINAR PRESENTATION FOR PUPILS:
(GUIDELINES)

Aims of the Project

Pupils should be informed about the nature and purpose of the project as well as what is expected from them. The overall purpose is to study Geography through printed materials which have been prepared to guide pupils' learning. The general goals of the study materials are:

i. To introduce pupils to general understanding of latitudes and longitudes and their uses on maps.

ii. To introduce pupils to general understanding of the continents of the world and the world's major physical features.

iii. To introduce pupils to general understanding of major climatic regions of the world.

Expectations. The following are expectations concerning pupils in their respective groups:

PUPILS UNDER TEACHERS' INDIVIDUALIZED INSTRUCTIONAL ASSISTANCE

A. General Information: Information on how to work on the study materials

1. Duration of the Study materials: - each module should be completed in a maximum of one month, at the rate of 3 hours a week. The whole program will take three months.

2. Pupils will be pretested first after this seminar, then each individual will be given a modular package for studying during sessions only.

3. There are three modules in total. The first module is on latitudes and longitudes and how they are used on maps; the second module deals with location of major continents of the world and their general physical features; the third module is on major climatic regions of the world.

B. Instructional Assistance:

1. The study materials are designed to guide pupils to study individually and independently. However, if a pupil has problems in understanding the subject he/she is free to ask a teacher for individualized instructional assistance. A teacher will be present in the class to assist pupils who need help.

2. Pupils will be required to do some tests. In case a pupil has not performed well in a given test, he/she can ask the teacher for guidance in correcting the items which are difficult for an individual pupil to re-attempt.

C. Procedural Information:

1. When doing practice items and tests, pupils are asked to attempt all questions.

2. Pupils are asked to use pencils only in all work requiring writing or marking throughout the project. Using pencils facilitates erasing errors and making corrections.

3. Pupils are also asked to read all the information, instructions, and subject contents very carefully in each module in order to benefit from the program.

4. Pupils are required to read each segment of subject presentation first, then do practice questions for each segment, and mark them by comparing with the answers given after each question.

5. Pupils are free to ask questions individually to a teacher concerning the class segments, practice questions or even test questions, if they are not clear.

6. After each individual pupil has finished working on the module, including the revision tests, then he/she will do a post test. In this case each pupil will report to the teacher on having completed studying the module and the teacher will provide the post test questions.

7. At the end of the program, pupils will be given program evaluation forms to complete. The purpose of these forms is for pupils to provide comments on the program according to the questions asked in the forms.

D. Requirements of the Program:

1. Each individual pupil is required to have the following things for the program: i) .pencil, eraser, and pencil sharpener; ii). school atlas - if a pupil does not have one the teacher will

provide school atlases during each session, and they will be collected at the end of each session.

2. Each pupil will be given a module which will have a number representing the pupil's name. Hence the pupil is expected to remember his/her own number as all test results will be displayed by numbers rather than names to maintain confidentiality.

3. In order to be able to continue to the next module each pupil will be required to score 70% or above in the revision test. If one gets below 70%, then one should review the study materials in areas where one did not do the questions well, and re-attempt only those questions that were incorrectly done. The second attempt should aim at 90% or above.

PUPILS UNDER NON-TEACHER INSTRUCTIONAL ASSISTANCE

A. General Information: Information on how to work on the study materials

1. Duration of the study materials: - each module will be studied in one month at the rate of 3 hours a week. Hence, the whole program will take three months.

2. Pupils will be pretested first before starting the program. The test will be done after the seminar.

3. There are three modules in the whole program. The first module is on latitudes and longitudes and how they are used on maps; the second module deals with location of continents of the world and their general physical features; and the third module is on the major climatic regions of the world and their causes.

B. Procedural Information:

1. The study materials are designed to guide pupils to study individually and independently. When doing practice items and tests, pupils are asked to attempt all questions. In each session, each pupil will start/continue with the study materials from where he/she stopped previously.

2. Pupils are asked to use pencils only in all work requiring writing or marking through out the project. Using pencils facilitates erasing for corrections. Pupils are also asked to read all the information, instructions, and subject contents very carefully in each module in order to benefit much from the program.

4. Pupils are required to read each segment of subject presentation first, then do practice questions for each segment, and mark them by comparing with the answers given after each question.

5. There will be no extra instructional assistance from the teachers on this program. Teachers are also informed of this point, except that, teachers will be present in the classes for administrative and supervisory roles. In this case, you can ask or report any thing that has to do with administration or supervision: for example asking for pencils, atlases, modules etc., or even asking for permission to go to the washroom. Pupils are requested NOT to ask questions to teachers in the class for knowledge on the segments, practice questions or even test questions.

Each individual pupil should work independently, and if a problem in understanding the questions or segments arises, the pupil should repeat reading both segments of information presentation and their examples. Hence, the need for careful reading instructions, subject contents, and the information in the each module is important.

6. After each individual pupil has finished working on the module, including the revision tests, then he/she will do a post test. In this case each pupil will report to the teacher on having completed studying the module and the teacher will provide the post test questions.

7. At the end of the program, pupils will be given program evaluation forms to be filled. The purpose with these forms is for pupils to provide comments on the program according to the questions asked in the forms.

C. Requirements of the Program:

1. Each individual pupil is required to have the following things for the program: i.) pencil, eraser, and pencil sharpener; ii). school atlas - if one does not have the teacher will provide school atlases during each session, and they will be collected back at the end of each session.

2. Each pupil will be given a module which will have a number representing the pupil's name. Hence pupil is expected to remember his/her own number as all tests results will be displayed by numbers and not names for confidentiality.

3. In order to be able to continue to the next module each pupil will be required to score 70% or above in the revision test. If one gets below 70%, then should revise the study materials in areas one did not do the questions well, and re-attempt only those questions that were incorrectly done. The second attempt should aim at 90% or above.

APPENDIX G.

(Translated from Swahili Language)

PROGRAM EVALUATION:
PUPILS' FORM

Information

1. Do not write your name anywhere on this form

2. The purpose of this evaluation is to get your opinion of the program you have been using.

3. You are requested to answer all the questions. You are requested to read carefully the questions and alternative answers before you decide which one to select.

In question 1, you are requested to select only one answer that best suits your opinion of the Geography program that you have been working on. Circle the letter representing your choice:

1. The Geography modules you have been using are designed to guide you in understanding the objectives of the program, reading instructions, studying segments of the subject contents step by step, doing exercises, and marking them by comparing with the answers you have been given after each question and doing tests. What is your opinion on this approach?

A. I dislike the approach very much
B. I dislike the approach
C. Not decided
D. I like the approach

E. I like the approach very much

2. Rank the following items by putting a tick under a letter which you think represents your feelings about the program:

KEY

A = strongly agree, B = agree,
C = undecided, D = disagree, E = strongly disagree .

TYPE OF RESPONSES	A	B	C	D	E
Found good progress in studying program					
Liked the modular program					
The study materials were understandable					
Would like modules in other subjects as well					

APPENDIX H.

(Translated from Swahili Language)

GUIDING QUESTIONS
ON
TEACHERS VIEWS

In evaluating the program you are requested to write short essay answers to the following questions:

1. What are your general comments on the modular study materials you have been using in class?

2. What are your comments on teaching Geography through modular approach?

3. In talking with the pupils in the program what things did you notice from them that you think are important to note?

4. What problems did you encounter in using the modular study materials with pupils?

5. What comments do you have on the introduction section of the pupils' study materials?

6. What comments do you have on the illustrations used in the study materials?

7. Comment on whether the pupils studied the materials independently or they needed instructional assistance from the teacher.

8. Comment on whether the test questions were fair or difficult for the pupils level of understanding.

9. Comment on whether the level of language used in the study materials was appropriate for the pupils level of understanding.

10. What things did you hear from non project teachers in the school about the program?

11. Have you ever used the modular approach with pupils in the school before?

12. If you have used the modular approach before list the subjects in which you used.

APPENDIX I.

Researcher's School Visits Schedule

RESEARCH WORK SCHEDULE FOR JUNE - NOVEMBER, 1989

Key: U 1 & 2 = Urban School 1 & 2
R 1 & 2 = Rural School 1 & 2
Visit = Main Researcher Visits schedule per week.

MONTH	WEEK 1	WEEK 2	WEEK 3	WEEK 4	REMARKS
JUNE	U of D Research Clearance	(a) Permission arrangements (b) First Testing Grade VII (c) Starting 1 to 1 formative evaluation	(a) Pretesting 1 Pupil (b) Providing Modules to one pupil for study (c) Marking test done by Grade VII pupils.	(a) Supervising one pupil (b) Post-testing one (c) Retesting Grade VII pupils for validating test instruments (d) Selection of 1 School	Selected one School for formative evaluation of the modules
JULY	(a) Sending test instruments to the Curriculum developer (b) Pretesting the selected class (c) Studying Module 1	(a) Completion of Module 1 (b) Module 1 Post-test (c) Studying Module 2	(a) Studying Module 2 (b) Module 2 Post-test (c) Marking post-test (d) Studying Module 3	(a) Module 3 Completion (b) Module 3 Post-test (c) Selection and visiting schools for the study (d) Seminar to teachers and pupils in 4 schools	

MONTH	WEEK 1	WEEK 2	WEEK 3	WEEK 4	REMARKS
AUGUST	(a) Pretest on 3 modules (b) Studying Module 1	Studying Module 1	Studying Module 1	Completing Module 1 Post test completion	
	Visit U 2 R 1 Visit R 2, U 1	Visit U 1, R 2 Visit R 1 U 2	Visit U 2, R 1 Visit R 2, U 1	Visit U 1, R 2 Visit U 2, R 1	
	Visit U 2, R 1 Visit R 2, U 1	Visit Ul, R 2 Visit R 1 U 2	Visit U 2, R 1 Visit R 2, U 1	Visit Ul, R 2 Visit U 2, R 1	
SEPTEMBER	Studying Module 2	Studying Module 2	Studying Module 2	Completing module 2 Post-test Completion	
	Visit U 2, R 1 Visit R 2, U 1	Visit U 1 R 2 Visit R 1 U 2	Visit R 1, U 2 Visit U 1, R 2	Visit U 1, R 2 Visit R 1, U 2	
OCTOBER	Studying Module 3	Studying Module 3	Studying Module 3	Completing Module 3 Post-test Completion	
	Visit R 1, U 2 Visit U 1, R 2	Visit U 1, R 2 Visit R 1, U 2	Visit R 2, U 1 Visit U 2, Rl	Visit R 1, U 2 Visit U 1, R 2	
NOVEMBER	(a) Pupils Evaluation (b) Teachers Evaluation	(a) Discussion with pupils (b) Discussion with teachers	Data Collating	(a) Data Collating (b) Going to Alberta	